

Safety assessment on chronic administration of *Swarna Bindu Prashan*— a popular Ayurvedic preparation of incinerated gold ash used as immune booster to children in southern India

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Swarna Bindu Prashan (SBP) is an Ayurvedic proprietary preparation of incinerated gold ash (*Swarna Bhasma*) administered frequently with ghee and honey to children as immune booster in southern-India. In this study, we assessed the safety parameters of SBP and its vehicle's effect on chronic administration. The groups of Wistar strain male albino rats were identified as control, vehicle group of ghee, honey and both ghee-honey and group of SBP, respectively. In SBP group, *Swarna Bhasma* was administered in dose of 5.625 mg/ kg body wt. alongwith 0.4 mL of each ghee and honey. Vehicles group also received same dose of 0.4 mL/kg of each substance in graded quantities by oral route for 90 days. During the course of study, no mortality and no significant behavioral changes were noticed in any group studied. The effect on food and water consumption and fecal and urine output remained unaffected. No major alterations were observed in hematology and serum biochemistry. Histopathology of vital organs also supported the nontoxic effect of SBP. It is concluded that the chronic use of SBP is safe and non-toxic at this tested dose level when compared to other vehicle groups.

Keywords: Ayurvedic therapy, Ghee, Honey, Immunomodulator, *Swarna Bhasma*

Traditional medicine has been the treatment of choice for mankind since ancient days, mainly for its safety without any side effects. Ayurvedic preparations are known for immunostimulatory activities and attenuation of seizures, cognitive impairment and oxidative stress, etc.^{1,2}. In this context, *Rashoushadies* (processed biomineral/metallic combinations) are potent drugs and forms an important part of Ayurvedic therapy. They act as *Rasayana* (immunomodulator)³. *Swarna Prashan* is a gold preparation in which gold (*Swarna*) is advised to be licked along with ghee and honey for a period of one month to six month from birth⁴. *Swarna Bindu Prashan* (SBP) is one of the proprietary preparations of it, in which incinerated gold (*Swarna Bhasma*) is administered with equal proportion of ghee and honey. *Swarna Prashan* has therapeutic effectiveness to enhance intelligence, digestion and memory power, physical strength, life expectancy and complexion. It is considered to be an aphrodisiac and also to cure infectious diseases⁴.

Though children, particularly in South India, are administered this every month at different interval especially in *Pushya Nakshtra* (a supreme platter among all lunar mansion in Vedic astrology)⁵, there is no study available on its safety. Therefore, in this study we evaluated safety of this popular Ayurvedic incinerated gold preparation in experimental animals.

Materials and Methods

Swarna Bindu Prashan (SBP) were procured from KLE Ayurveda Pharmacy, Belgaum, Karnataka and male Wistar rats of 150-180 g from Animal house, Jawahar Lal Nehru Medical College, KLE University, Belgaum. All animals were housed under standard conditions at an ambient temperature 22±3°C, relative humidity 45-55% and 12/12 h light/dark cycle. All animals were acclimatized in the laboratory about a week before commencement of the study. They had free access to standard pellet diet (Amruta brand Animal Feed, supplied from Bangalore) and fresh water *ad libitum*. Floor bed was changed every day, to maintain hygienic condition. Different groups of rats were placed in polypropylene cages with appropriate

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space for clear behavioural observations without any interference. The experiment protocol has been approved by the Institutional Animals Ethical Committee (IAEC), Shri BM Kankanwadi Ayurved Mahavidyalaya & Post-Graduate Studies cum Research center, KLE University, Belgaum.

Grouping

Thirty rats were divided into five groups of six each. Gr I (on normal diet & water *ad libitum*) was considered as control, and Gr II was administered with plain ghee; Gr III, honey; Gr IV, both ghee and honey ;and Gr V, with SBP group, along with normal standard animal diet and water *ad libitum*.

SBP dose for this experimental study was selected by considering maximum recommended clinical dose of *Swarna Bhasma* (15.5-62.5 mg)⁶ and its quantity suspended in vial A with vehicle ghee (Table 1). Thus, *Swarna Bhasma* dose was calculated by extrapolating the human therapeutic dose to animal dose by using the standard dose calculation procedure based on the body surface area ration⁷.

Calculation formula:

Clinical dose (a) × conversion factor (b) 0.018 = (c) per 200 g of rat

62.5 mg (a) × 0.018 (b) = 1.125 mg (c)/200 g of rat OR 5.625 mg/kg body wt.

Consequently, SBP dose was calculated to be 0.4 mL/kg from each vial of vehicle ghee and honey. Same dose (0.4 mL/kg) was administered from each vehicle once daily orally for respective vehicle group for 90 days.

At the end of the study period, animals were kept overnight on fasting and then blood was drawn through

retro-orbital region. Blood samples were collected for haematological and serological examination. Biochemical and hematological parameters estimations were carried out at City Diagnostic Center, KLE University, Belgaum, India. Histological studies were carried out at Department of Pathology, JLN Medical College, KLE University, Belgaum. Biochemical parameters were estimated using Cobas c 111 analyzer using standard kit and haematological studies were estimated in auto cell counter.

Statistical analysis

All the values were expressed as mean ± SE and data were analyzed by applying ANOVA* followed by Dunnett's 't' test**

Results

Gross behavior, Body weight & vital organs weight

Overall, all the experimental animals were active throughout the experimental study. No evidence of toxicity and mortality was observed. Effect on food intake and water consumption and fecal and urine output remained unaffected during the study. No significant behavioral changes were observed in any of the groups studied. Though comparable body weight gain was observed in the control and test drug groups, it was statistically insignificant ($P > 0.05$) (Table 2). Weight changes (g) of vital organs were observed to be insignificant ($P > 0.05$) in ghee, honey, ghee-honey (except brain weight) and SBP group animals compared to control group (Table 3).

Effects on biochemical parameters

The biochemical parameters data related to the effect of test drug and related vehicles drug are presented in Table 4. Mean values of blood glucose, serum cholesterol, serum triglycerides, SGOT, alkaline phosphatase and serum albumin of experimental animals of all groups showed insignificant ($P > 0.05$) difference compared to the control group. The mean values of SGPT (except ghee group), serum total protein (except SBP group), blood urea (except ghee

Table 1—Ingredients of *Swarna Bindu Prashan* kit

Name of the ingredient	Content	Vial mark
Gold (<i>SwarnaBhasma</i>)	100 mg	Addition with ghee in a labeled vial A
Cow's ghee	6ml	Vial A
Honey	6ml	Separately in labeled vial B

Table 2—Showing the body weight observation of experimental animals at different interval

Groups	Body weight (g)				Increase in Body wt %
	Initial at 0 th day	Days (at the end of)			
		30 days	60 days	90 days	
Control (Gr I)	173.0±1.98	243.67±4.30	306.17±7.29	333.5±7.75	92.77
Ghee (Gr II)	165.5±5.59	232.83±9.8	274.0±12.81	302.67±19.32	82.88
Honey (Gr III)	166.67±4.31	233.0±13.78	285.0±16.46	314.83±17.64	88.89
Ghee-Honey (Gr IV)	176.83±4.94	255.0±8.9	298.17±13.58	319.5±14.64	80.68
Swarna Bindu Prashan (Gr V)	160.33±5.25	238.17±11.19	297.33±10.41	347.0±11.11	116.42

Data: mean ± SEM

group ($P < 0.05$) and serum creatinine (except ghee-honey group ($P < 0.05$)) were also found insignificant ($P > 0.05$). The mean value of serum globulin of all four test groups were found significantly increased ($P < 0.05$) compared to that of control group.

Effects on haematological parameters

The hematological parameters data related to the effect of test drug and related drug are given in Table 5.

Mean values of hemoglobin [except honey group ($P < 0.05$)], eosinophil- monocyte- basophil counts, PCV [except honey group ($P < 0.05$)], MCV [except honey group ($P < 0.05$)], MCH and MCHC of experimental animals of all groups exhibited difference ($P > 0.05$) though insignificant compared to the control group. Significant decrease in WBC count was noticed in ghee, honey and SBP group compared to the control group. Significant increase ($P < 0.05$) in neutrophil count, and

Table 3—Showing the effect of test drugs on organ weight (g) of experimental animals

Organ	Control (G I)	Ghee (Gr II)	Honey (Gr III)	Ghee-Honey (Gr IV)	Swarna Bindu Prashan (Gr V)
Brain	2.80±0.06	2.54±0.07	2.56±0.08	2.44±0.06*	2.57±0.12
Thymus	0.72±0.03	0.63±0.06	0.51±0.06	0.67±0.06	0.60±0.07
Heart	1.31±0.03	1.12±0.11	1.26±0.07	1.43±0.07	1.23±0.08
Lungs	2.44±0.15	2.58±0.11	2.64±0.11	2.54±0.16	2.69±0.17
Liver	12.17±0.48	11.62±0.97	12.03±0.98	11.00±0.23	13.46±0.61
Spleen	1.24±0.05	1.24±0.09	1.13±0.13	1.11±0.06	0.98±0.07
Right Kidney	1.19±0.09	1.13±0.08	1.22±0.06	1.12±0.06	1.25±0.03
Left Kidney	1.07±0.04	1.05±0.06	1.16±0.07	1.09±0.05	1.09±0.02
Testis	3.55±0.11	3.61±0.16	4.08±0.25	3.47±0.07	3.34±0.11

Data: mean ± SEM, * $P < 0.05$ in comparison to the control group

Table 4—Showing the data related to Biochemical parameters of experimental animals

Parameters	Control (Gr I)	Ghee (Gr II)	Honey (Gr III)	Ghee-Honey (Gr IV)	Swarna Bindu Prashan (Gr V)
Glucose (R) mg/dL	109.17±10.3	142.33±19.5	71.00±3.41	160.5±34.01	148.0±29.97
Serum cholesterol mg/dL	41.67±2.42	42.17±2.79	40.17±2.51	42.33±4.48	43.67±3.57
Serum triglyceride mg/dL	78.17±9.16	88.17±12.91	80.83±9.80	67.17±12.24	96.17±13.07
SGOT (AST) IU/L	133.17±9.01	197.67±44.9	127.33±15.5	180.33±6.79	185.33±27.6
SGPT (ALT) IU/L	69.67±3.49	146±27.86*	106.33±14.4	94.83±3.36	110.5±17.12
Alkaline Phosphate IU/L	197.50±18.81	259.0±37.22	200.0±21.39	189.17±26.3	178.5±25.54
Serum total protein g/dL	6±0.86	6.55±0.17	6.41±0.14	6.38±0.27	6.97±0.10*
Serum albumin g/dL	3.82±0.05	3.93±0.2	3.8±0.08	3.55±0.20	3.77±0.12
Serum globulin g/dL	2.18±0.8	2.62±0.12*	2.62±0.11*	2.83±0.08*	3.2±0.11*
Blood urea mg/dL	38.17±1.54	43.0±1.24*	41.17±1.68	38.33±0.96	35.17±0.87
Serum creatinine mg/dL	0.23±0.02	0.25±0.02	0.2±0.00	0.43±0.02*	0.28±0.04

Data: mean ± SEM, * $P < 0.05$ in comparison to the control group

Table 5—Showing the data related to Hematological parameters of experimental animals

Parameters	Control (Gr I)	Ghee (Gr II)	Honey (Gr III)	Ghee-Honey (Gr IV)	Swarna Bindu Prashan (Gr V)
Hb (g%/dl)	14.2±0.38	12.48±0.99	11.35±0.55*	13.03±0.26	13.01±0.22
WBC cl/cmm	14000±1941.76	7883.33±512.78*	8338.33±200.84*	10404±1080.02	8883.33±568.28*
Neutrophil%	28.50±2.80	29.50±0.96	31.83±0.40	44.83±2.17*	40.67±1.45*
Lymphocyte%	64.33±1.9	64±0.97	63.17±0.60	52.67±2.21*	53.67±1.63*
Eosinophil%	4.83±0.60	4.83±0.48	3.83±0.31	3.83±0.31	4.00±0.48
Monocyte%	2.33±0.56	1.67±0.33	1.17±0.17	1.83±0.31	1.67±0.21
Basophil%	00±00	00±00	00±00	00±00	00±00
PCV(%cmm)	41.38±0.44	39.60±2.50	34.65±1.79*	37.52±1.17	36.73±0.47
RBCmil/cmm	7.76±0.33	5.38±0.59*	4.43±0.31*	7.53±0.29	7.16±0.11
MCV cuminc	53.72±2.14	58.48±1.60	64.72±2.23*	49.92±1.02	51.33±0.46
MCHpg	18.30±0.40	19.32±0.73	20.47±1.16	17.35±0.44	18.03±0.22
MCHC	34.25±0.73	33.25±0.40	32.30±0.48	34.77±0.71	35.37±0.25
RDW	17.25±0.90	16.92±0.19	15.83±0.42	14.50±0.26*	14.68±0.12*

Data: mean ± SEM, * $P < 0.05$ in comparison to control group

significant decrease ($P < 0.05$) in lymphocyte count and Red cell distribution width was noticed in animals of SBP as well as ghee as well as honey groups.

Effects on electrolytes parameters

Table 6 provides the data on electrolytes parameters related to the effect of test drug and related drugs. There was insignificant difference ($P > 0.05$) in the mean values of serum sodium except honey group ($P < 0.05$), potassium and chloride compared to control. Significant decrease ($P < 0.05$) in serum sodium was noticed in honey group compared to the control group.

Histopathology of organs

In SBP group, no remarkable observations were seen in the histopathological report of all vital organs. In ghee group, sparse inflammation and patchy consolidation were observed in the histopathology report of lungs, while mild to moderate triaditis were noticed in histopathology of all section of liver which was non-specific. Kidney showed mild pyelonephritis

and mild mesangial proliferation. Similarly, in honey group, mild pneumonia was noticed in the histopathology report of few sections of lung while kidney reports showed mild mesangial proliferation. In vehicle group, ghee-honey sparse inflammation was observed in histopathology report of lung, while mild triaditis was noticed in histopathology report of few sections of liver. (Figs 1 A-E & 2 A-E exhibit the histopathological sections of Liver and Kidney respectively)

Discussion

In this study, from toxicological point of view, the maximum recommended clinical *Swarna Bhasma* dose was converted to animal dose and consequently SBP dose was administered by considering the quantity of *Swarna Bhasma* suspended with vehicle ghee in vial A. Impaired food, and water intake is one of the important signs of toxicity⁸. However, here, we observed differences in food and water intake of all experimental animals to be insignificant which is in alignment with Annapoorani *et al.*⁹ who have also

Table 6—Showing the data related to different electrolytes of experimental animals

Parameters	Control (Gr I)	Ghee (Gr II)	Honey (Gr III)	Ghee-Honey (Gr IV)	Swarna Bindu Prashan (Gr V)
Na+	149.33±4.4	121.83±5.1*	149.5±6.7	149.83±1.9	193.67±4.3*
K +	5.23±0.11	6.42±0.56	5.07±0.06	4.67±0.18	6.0±0.48
Cl -	102.17±0.60	101.5±0.67	101.83±0.75	100.83±0.31	103.83±0.95

Data: mean ± SEM, * $P < 0.05$ in comparison to the control group

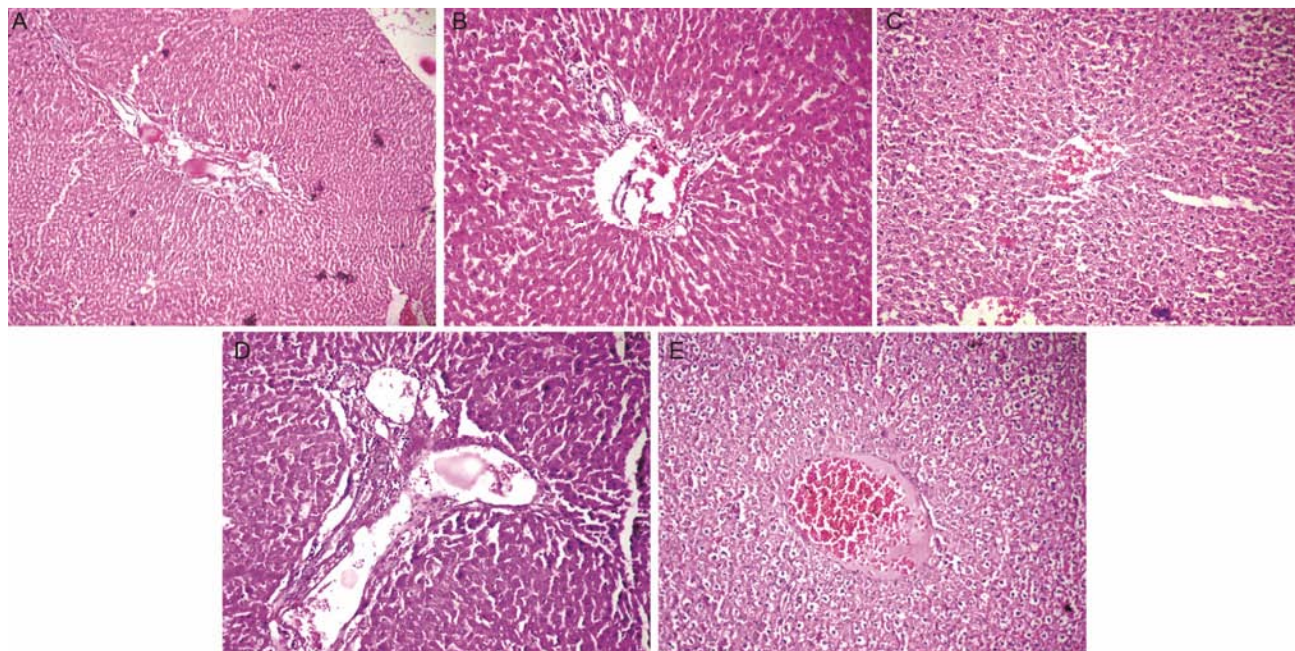


Fig. 1—Effects of Control (A), Ghee (B), Honey (C), Ghee-honey (D) and *Swarna Bindu Prashan* (E) on Liver. MT, mild triaditis.

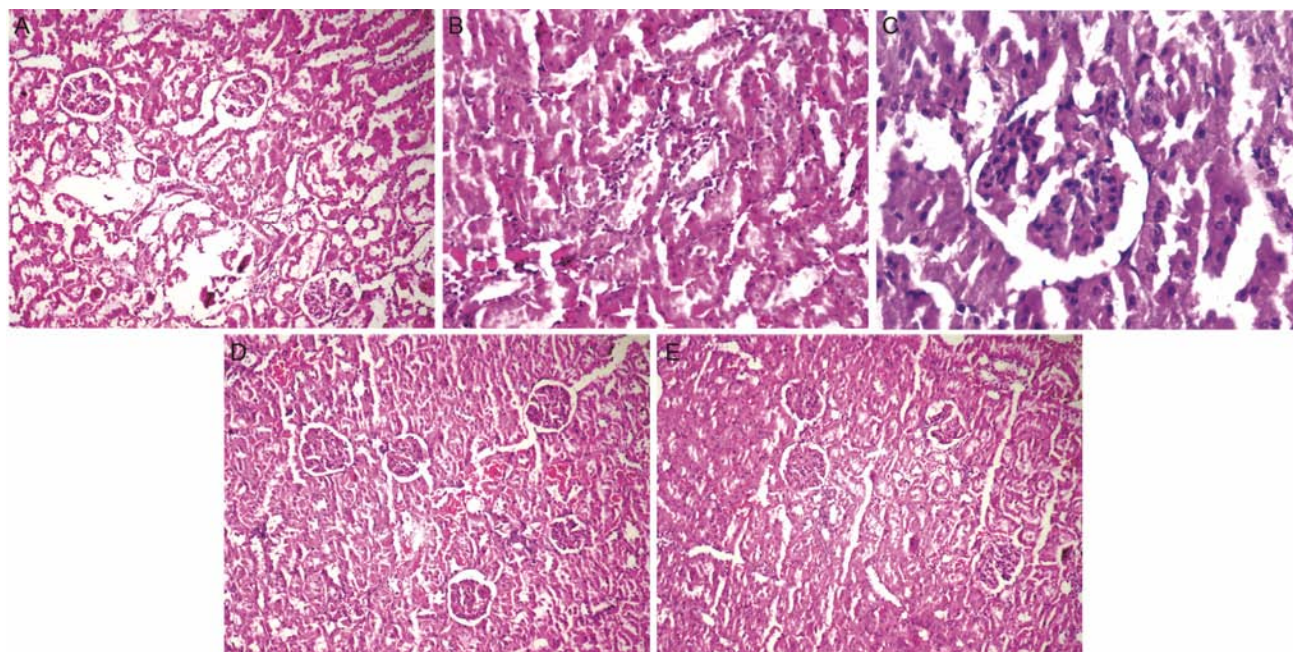


Fig. 2—Effects of Control (A), Ghee (B), Honey (C), Ghee-honey (D) and *Swarna Bindu Prashan* (E) on Kidney. MMP, mild mesangial proliferation

observed that food intake and water intake were unaffected. SBP group animals passed normal feces. Oily fecal matter was passed by animals of ghee group which may be due to prolonged administration of ghee (oleaginous substances)¹⁰. Honey group animals passed foul feces in later stage of study. Honey is rich in carbohydrate¹¹. Study suggested that the colonic flora also produces carbon dioxide, short-chain fatty acids, organic acids, and trace gases in the presence of unabsorbed fructose^{12,13}. It is also known that long exposure of honey may lead to indigestion¹⁴.

Weight gain as observed in all the animals indicates that the test drug does not cause serious organ damage or derange any physiological function. Ghee group animal weight was significantly decreased between 30 and 60 days. Short chain fatty acids do not contribute to body weight gain. Long term intake of ghee may act as *Rasayan* (a nutrient to body and mind with adaptogenic, neuroenhancing, immuno-endocrino modulator properties)¹⁵. SBP group has exhibited significant increase in weight between 60 and 90 days compared to other groups. Increased food intake and body weight gain are indicative of enhanced growth of the animals. This effect could be attributed to *Agnivardhak* (increased digestive power) property of SBP that leads to *Balya* (strength), *Bruhana* (nourishes to all bodily tissue) properties⁴. Progressive increase in the body weight of the rats during 90 days study as a result of

administration of SBP demonstrates the improved nutritional state of the animals.

Weight changes (g) of vital organs were observed to be insignificant in ghee, honey, ghee-honey (except brain weight) and SBP group animals compared to control group. Difference in brain weight of ghee-honey administered group was observed in the form of significant decrease compared to the control group. However, relative organ weight (per 100 g) of same experimental animal was not significant ($P > 0.05$). Average increased body weight of the same group was also seemed less compared to control and other test groups, and hence it may be due to the same reason.

Blood glucose levels were found to be insignificantly ($P > 0.05$) increased in ghee, ghee-honey and SBP groups and no such effect was observed in honey group. It indicates that sweetness of honey has not contributed to rising of glucose level in honey administered group, it was found to be slightly decreased but cholesterol and triglycerides levels were not changed. The lower value of glucose in test group may be because of increased glucose metabolism in normal rats¹⁶.

SGOT (aspartate transaminase/AST) activity was found increased in ghee, ghee-honey and SBP groups and decreased in honey only group but the observed changes were insignificant, and hence are not indicative of any functional derangement. SGPT

(alanine transaminase/ALT) activity was significantly elevated in ghee group compared to the control group while it was not affected to significant extent in other groups. SGPT elevation is indicative of tissue degeneration especially in liver. Since liver histological examination showed normal profile, the significance of the elevation is not known. Both these enzymes are found in most of the tissues, but the relative amounts vary. Heart muscles are richer in SGOT, elevated values seen in myocardial infarction whereas liver contains both but more of SGPT. Increases in both transaminases are found in liver diseases, with SGPT much higher than SGOT. But their determination is of extreme use in assessing the severity and prognosis of parenchymal liver diseases especially acute infectious hepatitis (viral or toxic) and serum hepatitis. In these two conditions, highest values in thousands units are seen. Very high values are also obtained in toxic hepatitis, jaundice, cirrhosis of liver and hepatic necrosis. Increases are comparatively less in drug hepatitis¹⁷. No such remarkable elevation could be observed with SBP group hence it is inferred to have no proclivity to produce tissue damage.

Alkaline phosphatase (ALP) enzyme is found elevated in a number of organs related pathology, mostly in bones, liver, small intestine, kidney, and placenta. It increases in both infectious hepatitis (viral hepatitis) and post hepatic jaundice (extra hepatic obstruction) but rise is usually much greater in cases of obstructive jaundice, in which 200 units or more may be found¹⁸. Increase in the activity of ALP in liver diseases is not due to hepatic cell disruption, nor to a failure of clearance, but rather to increased synthesis of hepatic ALP. ALP is useful in diagnosis of rickets, hyperparathyroidism, carcinoma of bone and obstructive jaundice (cholestasis), infective hepatitis, cirrhosis of liver. Collectively, ALP, AST & ALT are elevated in obstructive jaundice¹⁸. Ghee group shows all three values in elevated manner, same group experimental animal shows mild to moderate triditis. Whereas the insignificant increase in the value of these enzymes as observed in other test groups, may be non-specific. The reason why changes were observed in ghee group is not known.

Total protein was found significantly increased in SBP group and insignificant increase in the rest of the 3 test groups compared to the control group. Serum globulin was found also significantly increased in

SBP, ghee, honey, and ghee-honey groups compared to control group. Serum globulin is also part of total protein. Hence, increase in total protein may be because of increase in serum globulin. Determination of total proteins and albumin and globulin ratio (and A:G ratio) is useful in assessing the prognosis in chronic liver diseases. Liver is the site of albumin synthesis and also possibly of some of α - and β - globulins¹⁹. In infectious hepatitis, quantitative estimations of albumin and globulin synthesis may give normal results in early stages. In advanced parenchymal liver diseases and cirrhosis liver, the albumin is grossly decreased and the globulins are often increased. The albumin may fall below 2.5 % and may be a contributory factor in causing oedema in such cases²⁰. Elevation can also be due to induction of liver enzymes.

Significant increase in serum creatinine level in the serum of vehicle group of ghee-honey was noticed, increased creatinine level is a sign of abnormal kidney function or indication of nephrons damage in kidney²¹. However, histopathology report excluded this sign of toxicity in kidney of the same group. It may be indicative of increased muscle activity.

Serum sodium level was found significantly increased in SBP group compared to control group. Increase in serum sodium level showed hypernatremia. Loss of water from body causing dehydration, results in hypernatremia. Increase in serum sodium concentration also noticed in rapid administration of sodium salts. This may be noticed in different pathological conditions, which causes sodium and water retention in the body, leading to edema. But in this group, 24 h urine output was found to be within the normal range insignificant ($P > 0.05$) It means there is no retention of water in this group. Ghee group animal showed sudden intake of water after administration of ghee. Daily intake of water in same group was insignificantly more compared to control group. Hyponatremia is associated with hypovolaemia having features of thirst, dizziness, weakness, dry mouth, postural hypotension, confusion²².

Non-significant decrease of haemoglobin % was found in experimental animals of ghee, ghee-honey and SBP group compared to the control group but significant decrease in Hb% was noticed in vehicle group of honey. Significant decrease in hemoglobin in honey group indicated anemia. Significant decrease in packed cell volume and red blood corpuscles and significant increase in mean cell volume indicate the

normocytic- normocromic anemia²³. Total WBC count of experimental animals of ghee, honey and SBP group was found to be significantly decreased. Significant increase in neutrophil count, significant decrease in lymphocyte count and red cell distribution width (RDW) was noticed in animals of SBP and in the ghee-honey vehicle group. Collectively, these findings state that there is some stressful condition and activation of immune system²⁴. It may be due to the side effect of the drug or may be due to the immune stimulant effect of the drug. However, histopathological report of the liver, spleen, and bone marrow showed normal cytoarchitecture hence the above reasons may be ruled out. Activation of immune system may be reason of these changes. Same was observed in the ghee-honey vehicle group as well. Hence, the observations and changes in these values as observed in the SBP group may be due to the vehicle effect. Differential WBC analysis revealed an increase in the percentage of neutrophils possibly suggesting a boost in the acute immune response of the body²⁴. An increase in neutrophils possibly suggested a boost in defense, mainly acute response to infections or antigens. This is because neutrophils are essential first line defense of the body against infections or introduction of antigens and neutropenia (decrease in neutrophils) makes an individual highly susceptible to infections²². C-reactive protein observed weakly positive in SBP in one animal. Positive in C-reactive protein shows beginning of acute infection. SBP may be capable to minimize acute infection. Because it was progressively positive in ghee-honey, honey and ghee groups respectively. Other hematological parameters were not affected in SBP treated group. Remaining changes in hematological parameters in other tested groups were considered as non-specific.

No remarkable observations were seen in the histopathological report of brain, thymus, liver, kidney, spleen, stomach, heart, lungs, testis, and bone marrow in the experimental animals of SBP group. Nonspecific changes in tissue histopathology of vital organs of treated group ghee, honey and ghee-honey groups were noticed. Mild to moderate triaditis was observed in all sections of liver tissue in ghee only given group. Triaditis doesn't affect just one organ. It is a combo disorder of irritable bowel disease (IBD) problems with the biliary system and pancreatitis. In most of the cases, it shows similar symptoms as fatty liver changes. In one such study, ghee was used as the

sole source of fat at a 10% level in the diet of experimental animals, which do not give any support for linking ghee consumption to hypercholesterolemia and hyperlipidemia, which are considered risk factors for heart diseases. Consuming increased levels of ghee reduced serum cholesterol and triglyceride levels²⁵. The most significant changes were observed in PUFA levels. However, in the indigenous Ayurvedic system of medicine, ghee is used in the preparation of a number of formulations for treating allergy, skin, and respiratory diseases and is considered to induce many beneficial effects on human health²⁶. Few sections of tissue of lungs of test group ghee and honey were noticed with sparse inflammation which was nonspecific. One section of kidney exhibited mild mesangial proliferation.

Ghee and honey are two most frequently used vehicles for administration of Ayurvedic preparations^{27,28}, as previous studies also indicated the recovery as well as nontoxic effect of these *Bhasmas* on ponderal, biochemical, haematological and histopathological parameters on experimental animals^{29,30}. *In vivo* pharmacological study revealed that *Suvarna Bindu Prashan* acted on immunological system³¹. Similarly, one of the clinical study on children of 4-5 years age group, showed that SBP combination is significantly effective on humoral antibody formation and acted on immunological system by a rise in total protein and in serum IgG levels³². With these results and findings SBP may be accepted as a positive health care program³³.

Conclusion

Animals when administered with *Suvarna Bindu Prashan* (SBP) independently as well as with the vehicles for longer duration did not show any mortality. Therefore, it indicates the safer use of drug on chronic administration. Increase in the body weight was observed in all the groups compared to the control group. This shows that the drug is well tolerated and does not have serious tissue degenerative effects. Some effects, which were noticed in SBP, may be due to effect of vehicle. Presence of *Swarna Bhasma* in formulation possibly lowered these adverse effects.

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