EFFECT OF SOYBEAN AND RICE BRAN OIL SUPPLEMENTATION ON NUTRIENT UTILIZATION, LACTATION PERFORMANCE AND MILK FATTY ACID PROFILE IN SURTI GOATS

or

" DESIGNER GOAT MILK"

Dr. Ajay P. Raval,
Assistant Professor,
Department of Animal Nutrition,
College of Veterinary Science & AH,
Kamdhenu University, Navsari, Gujarat.
Mobile : + 91 9924874477
Email: dr.ajayraval@kamdhenuuni.edu.in

CON

Compound concentrate mixture + green jowar and pigeon pea straws (Basal Diet)

RBO

Basal diet+ Rice bran oil @ 3% of DMI

SBO

Basal diet+ Soybean oil @ 3% of DMI

SRBO

Basal diet+ Equal blend of soybean and rice bran oil @ 3% of DMI

6 Multiparous animals/per group

150 days experimental period

Milk yield and composition parameters

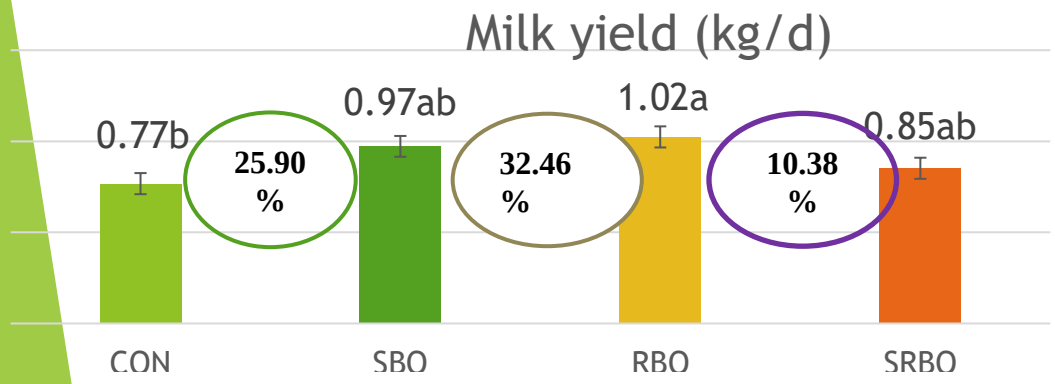
Milk fatty acid profile

Rumen liquor parameters

Blood parameters

Table Production performance of experimental Surti does supplemented with vegetable oil

Parameters	CON	SBO	RBO	SRBO	SEM	P value		
						Diet	Time	DxT
DMI (g/d)	975.31	1016.27	1008.91	994.54	28.42	0.751	0.001	0.998
Yield								
Milk (kg/d)	0.77^{b}	0.97^{ab}	1.02^{a}	0.85^{ab}	0.06	0.007	0.216	0.993
Fat (g/d)	28.16^{c}	47.19^{ab}	52.11^{a}	39.83^{b}	2.88	0.001	0.322	0.959
SNF (g/d)	62.18^{b}	78.11^{ab}	80.47^{a}	66.46^{ab}	4.58	0.012	0.110	0.987
Protein (g/d)	23.54^{b}	29.80^{ab}	33.63^{a}	25.88^{ab}	1.96	0.002	0.638	0.947
Lactose (g/d)	31.69^{b}	40.09^{ab}	41.79^{a}	34.65^{ab}	2.54	0.019	0.265	0.945
Total solid (g/d)	92.20^{b}	125.33^{a}	128.81^{a}	94.00^{b}	8.82	0.002	0.171	0.974
FCM (kg/d)[1]	0.73^{c}	1.10^{ab}	1.19^{a}	0.94^{bc}	0.08	0.001	0.291	0.978
SCM (kg/d)[2]	0.70^{c}	1.02^{ab}	1.09^{a}	0.86^{bc}	0.06	0.001	0.204	0.972
ECM (kg/d)[3]	0.64^{c}	1.19^{ab}	1.42^{a}	0.79^{bc}	0.12	0.001	0.265	0.885
Milk energy output (MJ/d)[4]	2.15^{c}	3.17^{ab}	3.47^{a}	2.70^{bc}	0.19	0.001	0.401	0.957
Milk energy content(MJ/kg)[5]	2.82^{c}	3.30^{ab}	3.37^{a}	3.17^{b}	0.05	0.001	0.379	0.577
Milk efficiency								
MY/DMI	0.81^{b}	1.08^{a}	1.09^{a}	0.87^{ab}	0.07	0.014	0.001	0.996
FCM/DMI	0.77^{b}	1.20^{a}	1.27^{a}	0.96^{ab}	0.08	0.001	0.003	0.994



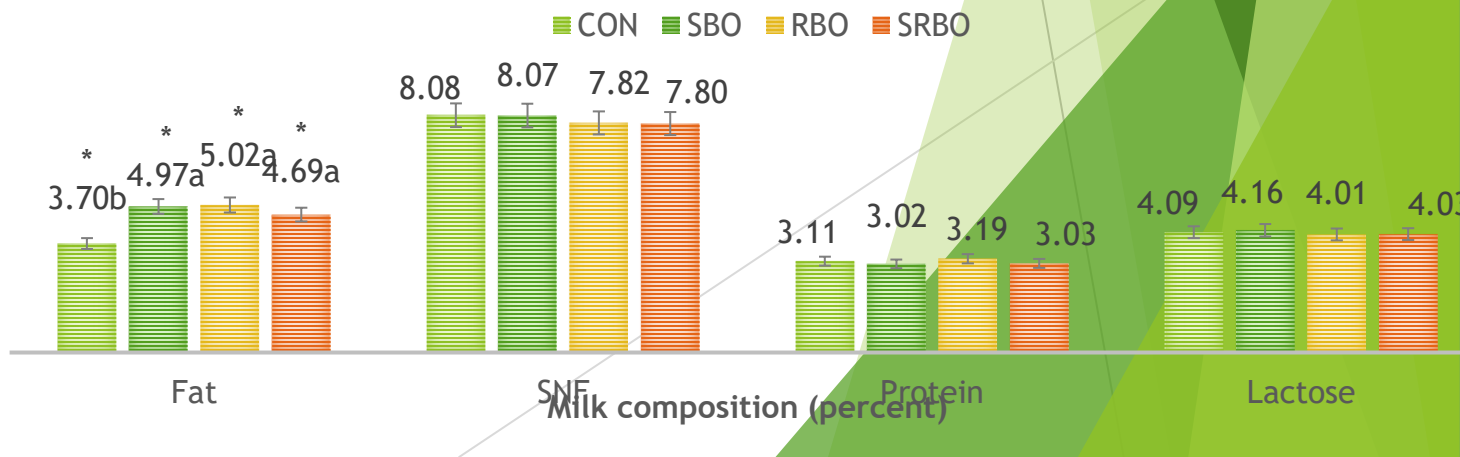


Table : Milk fatty acid composition (% FAME) of experimental animals supplemented vegetable oil

Parameter	CON	SBO	RBO	SRBO
n-3	0.32	0.37	0.34	0.32
n-6/n-3	5.06^{b}	8.78^{a}	8.87^{a}	9.78^{a}
SCFA (4-10)	7.15^{a}	4.88^{b}	4.29^{b}	4.38^{b}
MCFA (12-16)	35.71^{a}	26.67^{b}	27.38^{b}	25.86^{b}
LCFA (>16)	52.62^{b}	62.39^{a}	64.79^{a}	64.31^{a}
Atherogenicity index	1.56^{a}	0.94^{b}	**0.87^{b}**	0.82^{b}
Thrombogenecity index	2.04^{a}	1.70^{b}	**1.70^{b}**	1.64^{b}
h/H	1.23^{b}	1.85^{a}	1.82^{a}	1.92^{a}
Steroyl co Desaturase	0.06	0.04	0.04	0.04
Saturation index	0.37	0.45	0.45	0.44
Elongase	0.65^{b}	0.75^{a}	0.74^{a}	0.75^{a}
Peroxidisability index	4.49^{b}	6.66^{a}	6.24^{a}	5.90^{a}

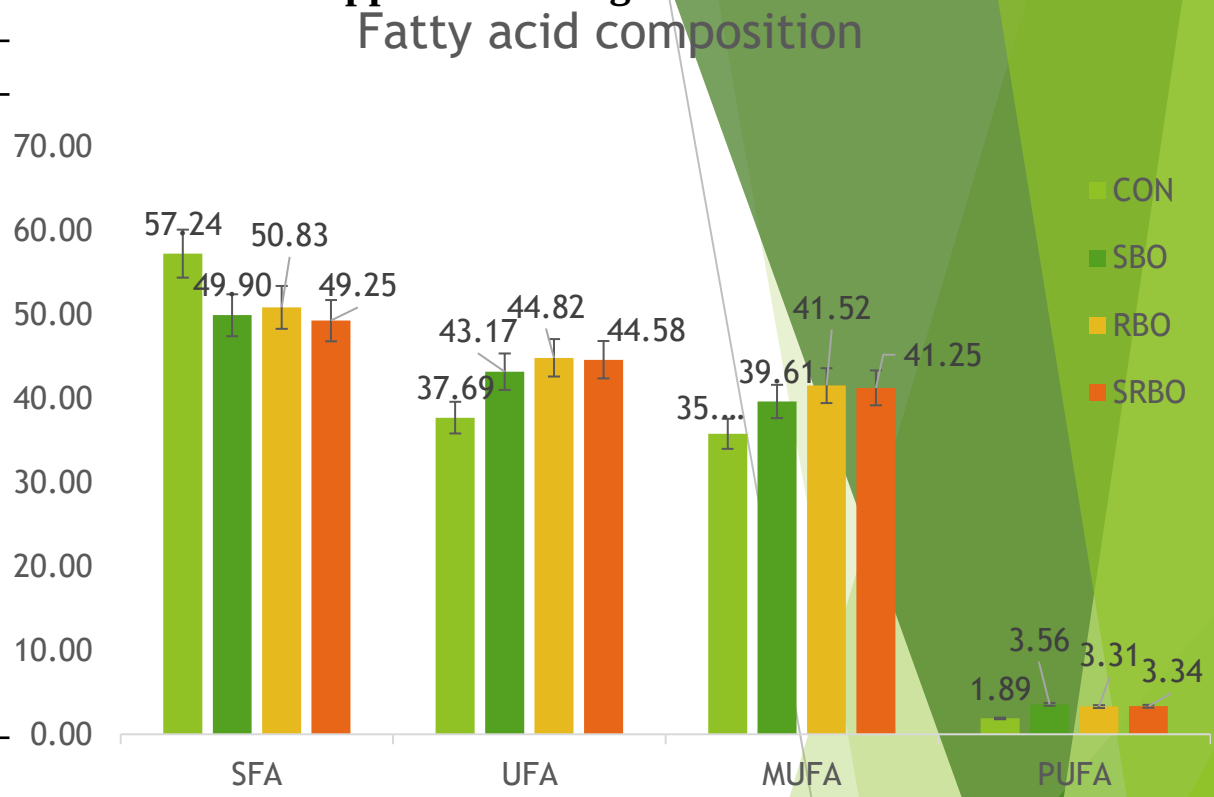
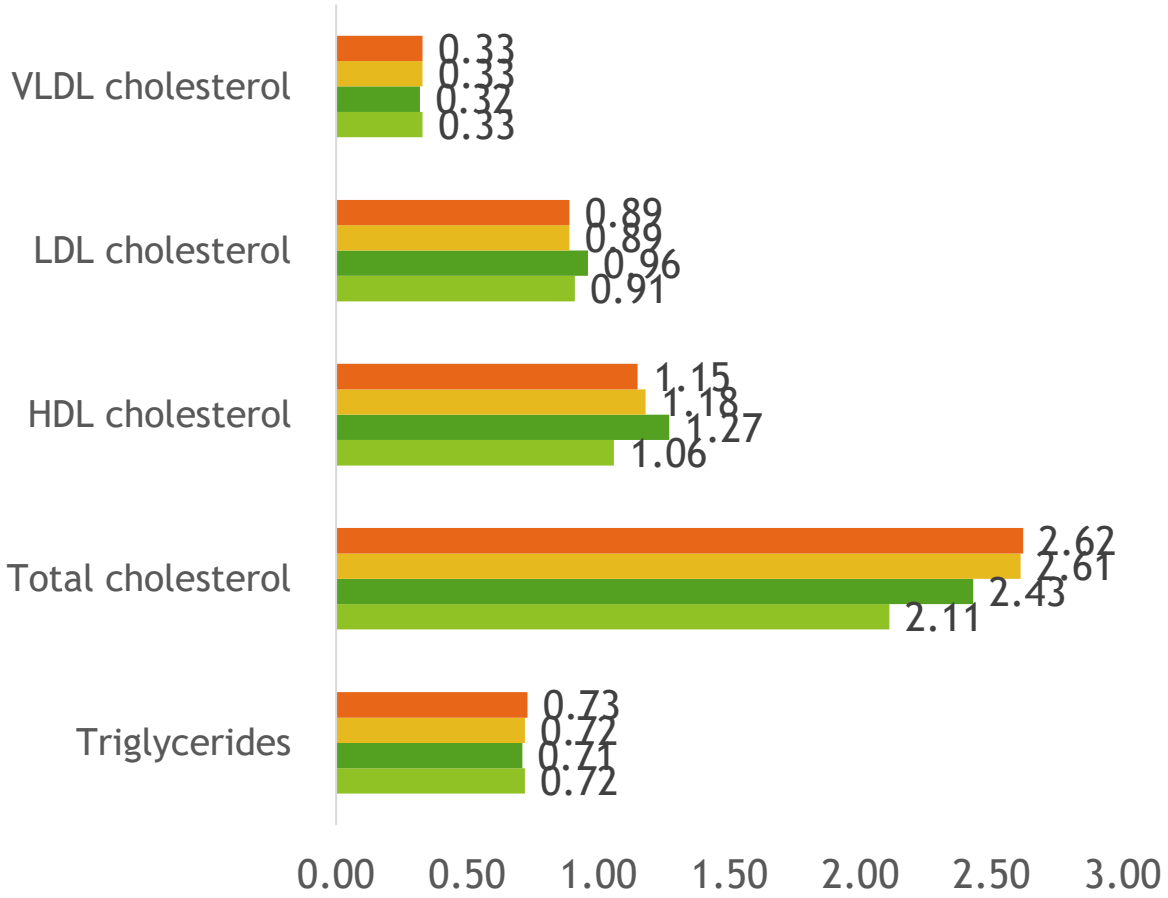


Table Effect of vegetable oil supplementation on ruminal fermentation of experimental animal

Parameters	CON	SBO	RBO	SRBO	SEM	P value		
						D	T	D x T
pH	6.44	6.49	6.41	6.45	0.04	0.645	0.688	0.207
TVFA (mmol/dl)	6.26^{b}	7.06^{a}	6.85^{ab}	6.99^{ab}	0.29	0.012	0.422	0.719
Ammonia nitrogen (mg/dl)	12.22	12.25	12.72	12.49	0.12	0.217	0.201	0.830
Total Nitrogen (mg/dl)	76.08	76.66	75.55	76.72	2.97	0.991	0.928	0.976
TCA Nitrogen (mg/dl)	29.43	31.30	30.55	30.72	1.38	0.810	0.512	0.988
Soluble Nitrogen (mg/dl)	46.65	45.36	45.00	46.00	3.02	0.981	0.663	0.990

Blood biochemical parameters in goats



	Triglycerides	Total cholesterol	HDL cholesterol	LDL cholesterol	VLDL cholesterol
SRBO	0.73	2.62	1.15	0.89	0.33
RBO	0.72	2.61	1.18	0.89	0.33
SBO	0.71	2.43	1.27	0.96	0.32
CON	0.72	2.11	1.06	0.91	0.33

Blood biochemical parameters in kids

	Triglycerides	Total cholesterol	HDL cholesterol	LDL cholesterol	VLDL cholesterol
SRBO	0.37	1.85	1.10	0.81	0.17
RBO	0.42	1.95	1.14	0.79	0.19
SBO	0.41	1.96	1.11	0.83	0.19
CON	0.41	1.72	0.96	0.84	0.19

Conclusions

- Both the vegetable oils either alone or in combination, increased production performance of Surti does in terms of milk yield, fat content and FCM of milk. The higher production is observed in rice bran oil supplemented group.
- Addition of soybean oil and/or rice bran oil showed significant improvement in nutritional quality of milk fat with respect to FA composition of milk, Atherogenicity index and thrombogenicity index indicating improvement in nutritional value of milk.
- Supplementation of soybean oil and/or rice bran oil increased total cholesterol and HDL cholesterol (good cholesterol) without affecting blood metabolites of does. Further, the maternal dietary lipid sources modified and improved circulatory lipid profile in terms of HDL cholesterol in suckling kid.

"Supplementation of soybean oil and rice bran oil either alone or in combination in lactating goats can be effectively used to improve nutritional quantity and quality of milk."