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ORIGINAL ARTICLE

Studying some Liver Enzymes in Native kid's Serum fed by *Sargassum angustifolium* in Bushehr Province

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ABSTRACT
To study the effect of Sargassum Angustifolium feeding on health and live enzymes, the 24 native kids with an average livre weight of 15.64 ± 3/2 kg and the average age of 5-6 months in a completely randomized experimental design with three levels of algae in the edible diet (0, 10 and 20%) and 8 repetitions (kids) in each treatment were experimented in Bushehr province in 75 days. Experimental groups of 10 and 20% algae (24 kids) were fed with Sargassum Angustifolium in coast of Bushehr city and also control group (zero percent algae) in this period was fed with normal diet. To examine possible changes in some liver enzymes, in four stages including the day zero, day 25th, day 50th and day75th of the experiment, blood samples were taken at each stage of different treatments. The results showed there was found a significant difference only for alkaline phosphates (ALP) among different treatments in zero and 75th days (p<0.05).
Key words: Liver Enzymes, Native Kids, Sargassum Angustifolium, Bushehr Province

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INTRODUCTION

Identifying and introducing the new spices is necessary because of the shortage of food supplies and increase in need of livestock products. Therefore, there have been performed a large number of researches for obtaining this value recently. Because the Bushehr province has a warm and humid climate, there are more than 2500000 of rural and nomadic livestock units and 1500000 ha of pasture that more than half of them have salty and poor vegetation [1]. Hence, identifying new supplies and determining their food values have significant effects on reducing the costs and increasing the efficiency on farms. Today algae are considered as an alternative of forage for feeding animals. Using the algae as forage was conventional in some European countries such as England, Ireland, Scotland and the Maghreb and some African, American and Asian countries for horses, pigs and sheep. Algae are collected in dry and proper seasons and maintain for improper seasons [9]. Recently, there have been conducted significant studies in order to getting the advantages of this new food supplies (i.e. algae) in Iran. Today, the alga industry is highly developed so that the alga as fertilizer due to its fiber plays an important role in softening the soil and also due to its micronutrients plays an important role in plant nutrition. Other applications of algae are in the diet of livestock and poultry [2]. It seems that there is a high imbalance of minerals and heavy metals in some species of seaweed that makes a difficulty in the possibility of their use in animal feeding. Therefore, determining the most appropriate level of algae is important to avoid poisoning. The aim of this study is to determine the most appropriate level of *Sargassum Angustifolium* in feeding of animals and its effect on the general health of native kids in Bushehr province.

MATERIALS AND METHODS

This study was carried out in the Animal Sciences Research station of Agriculture and Natural Resources Research center, located at 15 kilometers from the Ahrom city. *Sargassum Angustifolium* for using in animal feed had collected in the winter at the southern coast of Bushehr province, then they were dried in the sun and were crushed into small pieces by threshers (mean 2-3 cm). After that, The 24 male native kids (Adni breed) were selected with an average live weight of 15.64±3/2 kg and the average age of 5-6 months. A typical diet for a period of 15 days to adapt animals individually in the morning (8:00) and afternoon (14:00) was provided for animals in the appetite level. Fresh water was available and health

care operation was performed for animals and their place. They divided into three groups of eight after numbering in the ear. Average initial weight of kids was similar in different treatments. The experiment was performed on some liver enzymes in a 75-days period in order to studying the effects of different levels of *Sargassum Angustifolium* in livestock rations. This experiment has three diets included three different layers of *Sargassum Angustifolium* (0%.10% and 20%) that was written based on NRC (table1). Each diet was assigned to a group of eight animals. Kid's weight was measured weekly before the morning meal. Given amount of feed and residual feed were weighed on a daily basis. Blood operation in order to studying the changes of some liver enzymes of all kids in compliance with all safety and healthy issues were done in four steps including: zero day, day 25th, day 50th, day 75th of experiment. All blood samples taken from kids were transported to laboratory immediately.

Excel software was used in order to recording and organizing the data. Statistical analysis data were analyzed using SAS (1998) and means were compared by Duncan multiple range test at the 5% level.

Table1: Experimental diets fed to kids (shown by percent)

Treatments (%)			
3diet	2diet	1diet	component
20	10	0	*Sargassum Angustifolium*
20	30	36/5	Wheat straw
14	14	20	Alfalfa hay
14	14	14/5	Wheat bran
30	30	27	barely
1	1	1	salt
1	1	1	Vitamin and mineral supplements
100	100	100	total
			The chemical composition
1530	1530	1530	Metabolizable energy(k cal / kg)
75/3	75/3	75/3	Protein (g / kg)
0/67	0/43	0/38	Ca (%)
0/25	0/25	0/32	P (%)

Table 2: Comparing the chemical composition of *Sargassum Angustifolium* with alfalfa hay and wheat straw (٪)

DM %	GE cal/g	CP %	Mg %	CF %	Na %	Ash %	EE %	NDF %	ADF %	Ca %	P %	Mn Ppm	Cu Ppm	Fe Ppm	Zn Ppm	Analysis Feed
92/62	2316	4/87	1/32	7/1	3/06	41/29	0/3	16/96	14/48	3/57	0/04	64/92	5/69	205	14/75	Alga
93/56	4206	14/57	0/32	31/29	0/1	9/97	1/1	40/81	33/4	1/55	0/22	35/94	14/17	306/7	22/69	Alfalfa hay
94/57	3976	3/22	0/14	40/16	0/05	9/59	0/79	71/7	46/31	0/39	0/08	46/63	6/93	325/93	10/8	Wheat straw

Mercury (Mg) =Mg% crude fiber (CF) =CP% gross energy (GE), =GE cal/g dry matter (DM) = DM% acid detergent fiber (ADF) =ADF% ether extract (EE), =EE% more ash =Ash sodium (Na) =Na% neutral detergent fiber (NDF) =NDF% manganese (Mn) = Mn ppm calcium (Ca) =Ca% crude fiber (CF) =CF% zinc (Zn) =Zn ppm phosphorus(P) =P% iron (Fe) =Fe ppm copper(Cu) =Cu ppm

As Table 2 has indicated (Comparing the chemical composition of *Sargassum Angustifolium* with alfalfa hay and wheat straw) *Sargassum Angustifolium* regarding to dry matter (DM) is approximately equal to alfalfa hay and wheat straw. Amounts of gross energy (GE), crude fiber (CF), ether extract (EE), neutral detergent fiber (NDF) and acid detergent fiber (ADF) are less than alfalfa hay and wheat straw but they have more ash than alfalfa hay and wheat straw. *Sargassum Angustifolium* regarding to crude protein (CP) is higher than wheat straw and less than alfalfa hay. The measured amounts of minerals, *Sargassum Angustifolium* considering to mercury (Mg), sodium (Na), calcium (Ca) and manganese (Mn) are more than alfalfa hay and wheat straw, but phosphorus (P), copper (Cu), iron (Fe) are less than alfalfa hay and wheat straw. The amount of zinc (Zn) in *Sargassum Angustifolium* is less than alfalfa hay and more than wheat straw.

RESULTS

The results of the analysis and comparison of some liver-enzyme changes in indigenous kids fed with *Sargassum Angustifolium* in coast of Bushehr province have been shown separately in Tables 3 to 6. According to the table1 and 2 that compare the changes in some liver enzyme parameters of control treatment with 10 and 20% alga treatments, there was only found a significant difference of average concentration of alkaline phosphorous (ALP) in different treatments (P <0/05) at the zero day. ALP concentration was 208.33, 225.33 and 222.33, respectively in control. The normal average of alkaline phosphatase in goats is 220. In addition, in the day 75, also there was found a significant difference only in average concentration of alkaline phosphorous (ALP) in different treatments (P <0/05). ALP concentration in control, 10 and 20% alga treatments was 209, 233.33 and 226, respectively. The normal average of ALP in goats is 220.

Table3: Comparing the changes of some liver enzymes in kid's serums in control treatment, 10 and 20% algae in different experimental periods

Experimental periods				
Normal quantity	20 percent	10 percent	control treatment	
15	15	15	16	BUN (mg/dl)
1/30	1/20	1/16	1/16	Cr (mg/dl)
0/50	0/13	0/10	0/13	BILIRUBIN(mg/dl)
53	34/33	33/33	32/33	ALT (U/L)
340	182	187/33	185	AST (U/L)
220	222/66 [a]	225/33 [a]	208/33 [b]	ALP (U/L)
38	37/33	40/66	38	GGT (U/L)

has a significant different (05/0 >P). *

Table4: Comparing the changes of some liver enzymes in kid's serums in control treatment, 10 and 20% algae in different experimental periods

25 day trial				
Normal quantity	20 percent	10 percent	control treatment	
15	16/33	18/33	17/33	BUN (mg/dl)
1/30	1/16	1/16	1/10	Cr (mg/dl)
0/50	0/13	0/13	0/13	BILIRUBIN(mg/dl)
53	35/33	34/66	33	ALT (U/L)
340	183	185	186/33	AST (U/L)
220	223/33	227/67	210	ALP (U/L)
38	39/66	40/33	35	GGT (U/L)

has a significant different (05/0 >P). *

Table5: Comparing the changes of some liver enzymes in kid's serums in control treatment, 10 and 20% algae in different experimental periods

50 day trial				
Normal quantity	20 percent	10 percent	control treatment	
15	15/66	16	15	BUN (mg/dl)
1/30	1/06	1/23	0/96	Cr (mg/dl)
0/50	0/13	0/16	0/13	BILIRUBIN(mg/dl)
53	35	34/33	31/66	ALT (U/L)
340	182/33	188	183/33	AST (U/L)
220	227/33	226/33	212/66	ALP (U/L)
38	38	44/33	40/33	GGT (U/L)

has a significant different (05/0 >P). *

Table6: Comparing the changes of some liver enzymes in kid's serums in control treatment, 10 and 20% algae in different experimental periods

75 day trial				
Normal quantity	20 percent	10 percent	control treatment	
15	13	15	14/66	BUN (mg/dl)
1/30	1	1/10	0/86	Cr (mg/dl)
0/50	0/13	0/16	0/13	BILIRUBIN(mg/dl)
53 [a]	34/66	34/66	34	ALT (U/L)
340	181/33	185/66	187/33	AST (U/L)
220	226 [a]	233/33 [a]	209 [b]	ALP (U/L)
38	38	39/33	39/66	GGT (U/L)

has a significant different (05/0 >P). *

DISCUSSION

Although algae are not the main source of energy, they have a high food value in terms of vitamin and protein [13]. Using the algae as forage was conventional in some European countries such as England, Ireland, Scotland and the Maghreb and some African, American and Asian countries for horses, pigs and sheep. [9] Laboratory studies about sheep and seaweed have been limited. Han (1989) pointed out that *ulva lacluca* (Linnaeus) as an animal feed is categorized with high nitrogen and low energy and this alga is a useful supplement for sheep. [8] found an exponential increase in water and urine concentrations of kids after eating 20% and 30% *Macrocystis pyrifra.* The high concentration and misbalancing the minerals was well as presenting the heavy metals in some spices of algae are important factors for making adverse conditions on feeding. Hence, determining the most appropriate level of feeding for prohibiting poisoning is important [10]. [6] studied the effect of nickel on some liver enzymes of rabbit, they concluded nickel didn't have any effect on rabbit.The study of heavy metals on algae in five areas of the coast of Kuwait showed that these elements were highest in iron, zinc, copper, manganese, nickel, vanadium, and lead and their concentration in these areas had significant differences [12]. A study on deposits and six dominant species of algae was done in the coastal of Bushehr city and *Sargassum Vulgar* was introduced as an appropriate indicator of the biological monitoring of lead metal in that area [3].

The effect of zinc injection makes some disturbances in rats in the secretion of the alkaline phosphatase (ALP), aspartate aminotransferase (AST) and alanine aminotransferase (ALT) that this issue due to the damage of liver cells [4]. In this study regarding to the results of mean variances of some live enzymes of kid's serum in control, 10 and 20% algae treatment in different experimental periods, only there was found a significant difference in mean concentration of ALP an first and fourth periods (i.e. zero and 75th day).However, these changes can't because of liver problems and poisoning because these change were presented among all treatments in zero day. Also for proving liver problems, other enzymes should be changed and cover all parts of liver but it didn't happen in this study. A study was conducted by Jackson et.al (2005) on fifteen young sheep that three doses of 150, 200 and 300 mg of Mycrositice aeruginosa's extract were injected into them. Infected sheep at a dose of 300 mg showed a significant increase in concentration of AST, ALP, ALT and slight increase in blood urea nitrogen (BUN). The results were not consistent with the results of [11], because in this study up to 20 percent of *Sargassum Angustifolium* were used in kid's diet but there was found no significant changes in blood parameters of kids. The existence of these changes between two studies can be due to the type of alga and also the number and type of experimental animals.

SUGGESTIONS

1. Because our country, Iran, is facing a shortage of forage and food, algae can be used to overcome this problem.
2. Higher percentage of algae can be replaced in the diet in order to find its effects on different characteristics.
3. In addition to use this huge supply of food for livestock; it can be used for poultry and fish widely.
4. Other spices of algae will be tested in diet of different animals like sheep and cow.
5. Regarding to the importance of algae in the diet of poultry and fish and livestock, feed factories are necessary.
6. Another study will be performed about using the algae in diet and measuring the heavy metals in different organs such as kidney and liver.

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