Disposal of accumulated Seaweeds on beaches by treating them with different levels of urea and use it in feeding ruminant

Adel Saeidah[1], Lutfi Al meslati[1], Ismail Fetoure[2]
[1]Department of Food control, Faculty of Veterinary, Al-Zaytona University, Libya
[2]Department of Biotechnology, Faculty of Science, Al-Zaytona University, Libya
aedli2010@yahoo.com

Abstract:

Thousands of tons per year of seaweeds to be accumulated alongside the beaches without obtain any advantage of it. Study was conducted at Al-Zaytona University to treat the accumulated seaweed with different levels of urea and then use it in feeding ruminant.

The experiment was conducted on 20 local Berber lambs, which were divided into four groups: each group included five animals. During this period, studying increase in animal weight and the feed consumption rate. The results showed significant differences between the first group and the other groups, and there were significant differences between the first and second group compared with the fourth group in the studied factors.

The results obtained from this study showed that the, second group (seaweeds processed by 2% of urea), the third group (seaweeds processed by 3% of urea) could be used safely and present better results compare with first (control group). The study found that animals that were fed with seaweeds without mixing with urea were less consumed and palatable than other groups that fed seaweeds that mixed with urea. The study suggests that using seaweeds processed mixed with urea (2-3%) could reduce the cost of production and also helps to eliminate the huge quantities that come out of the sea during the autumn and winter and thus reduce the environmental pollution of the beaches.

Keywords: *Seaweeds, urea, ruminant, feed.*

التخلص من الأعشاب البحرية المتراكمة على الشواطئ بمعالجتها بمستويات مختلفة من اليوريا واستخدامها في تغذية المجترات

عادل سعيده[1]، لطفي المسلاتي[1]، إسماعيل فيتوري[2]
[1] قسم مراقبة الغذاء، كلية الطب البيطري، جامعة الزيتونه، ليبيا
[2] قسم التقنية الحيوية، كلية العلوم، جامعة الزيتونه، ليبيا
aedli2010@yahoo.com

المستخلص:

أجريت هذه الدراسة بجامعة الزيتونة للتخلص من الأعشاب البحرية (seaweed) المتراكمة على الشواطئ بمعاملتها بنسب مختلفة من اليوريا واستخدامها في تغذية المجترات والتي تقدر بآلاف الأطنان سنوياً في تغذية الحيوانات المجترة حيث أجريت التجربة على عدد (20) من خرفان البربري المحلية قسمت إلى أربع مجموعات كل مجموعة بها خمس حيوانات، المجموعة الأولى الشاهد تغذت على علف مركز+علف خشن (100% تبن البحر غير معامل) والمجموعة الثانية تغذت على علف مركز+علف خشن (تبن البحر معامل بنسبة2% يوريا) والمجموعة الثالثة تغذت على علف مركز+علف خشن (تبن البحر معامل بنسبة 3% يوريا) والمجموعة الرابعة

تغذت على علف مركز+(تبن البحر معامل بنسبة 4% يوريا) حيث تم تقطيعها لقطع صغيرة ورشها بمحلول اليوريا والماء المقطر كل حسب النسبة المذكورة سابقاً وخلطها جيداً حتى يحدث تجانسا للمخلوط ثم غطيت بغطاء بلاستيكي محكم لمدة 15 يوم، واستمرت التجربة لمدة ثلاثة أشهر وتم خلال هذه الفترة دراسة كل من الزيادة في وزن الحيوانات ومعدل استهلاك العلف وقد أظهرت النتائج وجود فروق معنوية مابين المجموعة الأولى والمجموعات الأخرى أيضاً هناك فروق معنوية بين المجموعة الأولى والثانية مقارنة مع المجموعة الرابعة في العوامل المدروسة.
ومن خلال النتائج المتحصل عليها من هذه الدراسة تبين أنه بالإمكان استخدم المجموعة الثانية (تبن البحر معامل بنسبة 2% يوريا) وكذلك المجموعة الثالثة (تبن البحر معامل بنسبة3% يوريا) بصورة آمنة و بنتائج أفضل من المجموعة الأولى (الشاهد) حيث وجد أن الحيوانات التي تغذت على تبن البحر بدون خلط مع اليوريا كانت أقل استهلاكاً واستساغة مقارنة مع المجموعات الأخرى التي تغذت على تبن البحر المخلوط مع اليوريا لذلك ينصح باستخدام تبن البحر المخلوط مع اليوريا بنسبة (2-3%) حيث يقلل استخدام تبن البحر المعامل من تكلفة الإنتاج وكذلك تساعد على التخلص من الكميات الهائلة التي تخرج من البحر خلال فصلي الخريف والشتاء وبالتالي التقليل من التلوث البيئي للشواطئ.

الكلمات المفتاحية: *تبن البحر، اليوريا، خرفان، علف خشن، المجترات.*

Introduction:

One of the main problems facing livestock keepers is providing affordable feed particularly protein sources which becomes on the top priority in diets .Rising prices of some substance content protein in nutrition can be major factor in hampering rising and production of livestock. protein is essential in daily food and rations must be met in order for animals to be able to build the necessary protein compounds and to compensate for what is being lost during vital processes during consumption and to benefit of it. Seaweeds, although area vailable and characterized by a high percentage of fiber and a small proportion of protein. These waste might have influence negative in a decrease in the level of consumption and benefit if not being treated well.
(Saker, 2004) found that feeding on marine plants had a positive consequence on immune function and activity of antioxidant.In order to improve the nutritional value of these wastes and address them in a number of ways, including natural cutting or grinding, to increase the amount of food consumed and thus increase the value of energy (Owens, 1983) reported that the consumption of hay is increased milling and mixing and also is treated hay in a vital way grinding and cubes. Microorganisms are used to destroy the plant cell wall, but there are other chemical factors, as the chemical treatment has improved both the level of consumption and reproductive of poor feed, (Economides, 1997). There is considerable interest in using urea as a generator for the resulting ammonia to treat seaweeds to improve their nutritional value by increasing the nitrogen ratio.

The study (Hsu et al., 1991) showed that seaweed treatment of urea improves nutrient value as increased nitrogen content and increased carbohydrate digestion also reduces the effect of salts on rumen micro organisms,(Johnson, 2007) found that the increase in salt concentration Especially sodium chloride, reduced digestion in the rumen as a result of changes in the value of (PH) The introduction of seaweed treated with urea for ruminants instead of part of the central feed helps to reduce the cost of food.

This study is consistent with the nature and conditions of Libya, which suffers from a lack of natural pastures and the lack of materials in the feed industry, especially the sources of protein nitrogen. Therefore, this study is an attempt to reduce the cost of feed production, especially the sources of protein nitrogen. The aim of this study is to identify the effect of seaweed treatment at different levels of urea: 0%, 2%, 3% and 4% on both increase in animal weight and feed consumption.

Materials and Methods:

The experiment was conducted on 20 local Berber lambs, Sam age and free of diseases and were vaccinated and vaccinated against infectious and endemic diseases and parasites food materials used in the manufacture of concentrated feed included (Corn, barley, soybeans, clover powder, mineral salts, vitamin mixture) to form part of the bush, which represents 60% of the feed provided to these animals, as well as coarse feed, which represents 40% and divided into 4 groups which are:

- Seaweeds: treated with urea 0% group A as control
- Seaweeds: treated with 2% urea B
- Seaweeds: treated with 3% urea C
- Seaweeds treated with 4%: urea for group D

the animals were randomly assigned into four groups each group had of five animals and each group was symbolized by A - B - C - D. and every single animal in the group was numbered 1 - 2 - 3 - 4 – 5.

And then put each group in the place allocated to them under the same environmental conditions and treated the same treatment in terms of providing water and hygiene as well as veterinary and other factors surrounding the animals so that there were no differences in the treatment of different among the four groups except the type of bush that is the subject of study,

Table (1) number of groups by experiment and animals per group and feed ratio.

Type of coarse feed	coarse feed in the scrub	% Of feed concentrated	Number of animals	Group number
Seaweeds treated 0% Urea	%40	%60	5	A
Seaweeds treated 2% Urea	%40	%60	5	B
Seaweeds treated 3% Urea	%40	%60	5	C
Seaweeds treated 4% Urea	%40	%60	5	D

The experiment was preceded by 15-day adaptation period. The experiment lasted for 40 days. Both the rate of increase in animal weight and feed consumption rate were measured.

statistical analysis:

At the end of the experiment all the information obtained was collected for statistical analysis CRD system to determine the significant differences between the four transactions.

Results and Discussion:

During this 6-week experiment, data related of average animal weight and feed consumption rate were collected throughout the experiment period.

Rate of increase in weight of animals:

The results of the study showed that the coefficients affect the rate of increase in the weight of animals in kilograms especially between the first group and the other groups. There are also significant differences between the first and second group compared with the fourth group in the studied factors and the table (2) shows the existence of significant differences between the four factors, any significant effect at the level of ($p<0.05$).

Table (2) the average ± standard error of the rate of increase in weight of animals in kilograms is calculated by treatment.

Groups / weeks	group (A) urea 0 %	group (B) urea 2 %	group (c) urea 3 %	group (D) urea 4 %
Start the experiment	11.75	12	11.5	11
First week + second	(12.4 ± 0.71 [a])	(12.7 ± 0.71[a])	(12.5 ± 0.71[a])	(12.1 ± 0.71 [a])
Third week +fourth	(13.2 ± 0.71 [a])	(14.4 ± 0.71 [b])	(14.6 ± 0.71 [b])	(13.4 ± 0.71 [a])
Fifth week +sixth	(14 ± 0.71 [a])	(15.6 ± 0.71 [b])	(15.3 ± 0.71 [b])	(14.2 ± 0.71 [a])

(Ab) averages that share at least one character within each row with no significant differences .

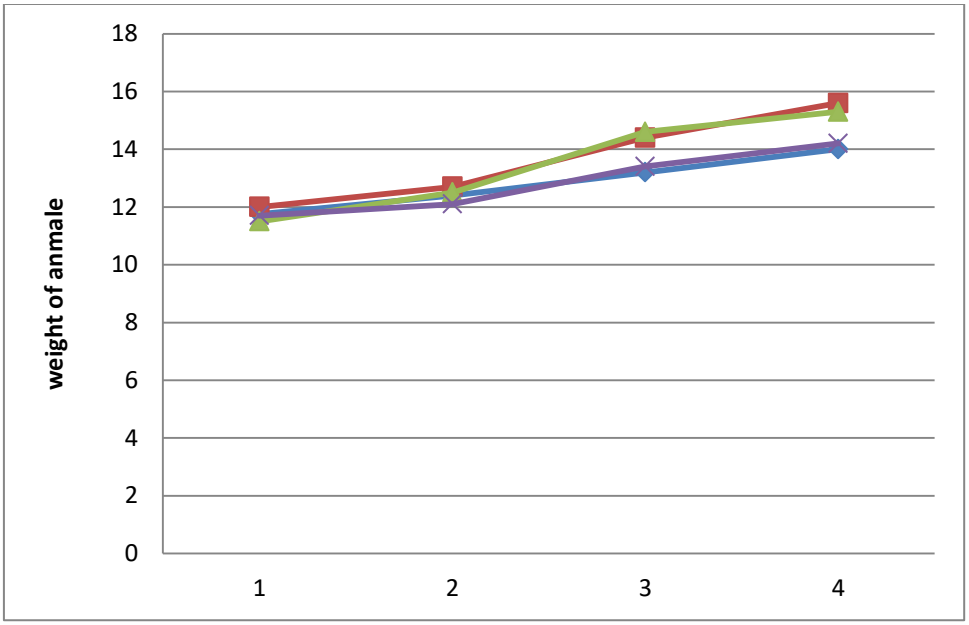

Figure (1) an increase rate in animals weight.kg/week

Average quantity of feed intake kg /animal/week:

The data obtained from the four groups showed that there were significant differences between the data during the experimental period through F test under (P ≤00.05). Table (3) and Figure (2) show an increase in feed intake between The second and third groups compared to the control group and the fourth group in each week of these weeks, where the coarse and remaining feed for each group. Study showed that groups of second and third groups recorded high rate of consumption as groups of control showed lees consumption as well as the fourth group which was feed seaweed. The consumption and nutritional value of seaweed can be improved by adding molasses and urea. This is in line with the study of (Abu Bakr 1993) who noted a significant improvement in seaweed consumption as well as further improvement of marine nutritive value after adding a percentage of molasses and urea where they provided a source of nitrogen microorganisms in the rumen to make the microbial protein industry in ruminants.

Table (3) the average quantity of feed intake ± standard error in kg / animal / week) for each treatment during the experiment period

Treatments / Weeks	group (A) urea 0 %	group (B) urea 2 %	group (C) urea 3 %	group (D) urea 4 %
First + second	(2.3 ± 0.144) [a]	(2.25± 0.144) [a]	(2.2± 0.144) [a]	(2.15± 0.144) [a]
Third + fourth	(2.6± 0.146) [a]	(2.95± 0.146) [b]	(2.8± 0.146) [b]	(2.5± 0.146) [b]
Fifth + sixth	(2.8± 0.147) [a]	(3.2± 0.147) [b]	(3.15± 0.147) [b]	(2.85± 0.147) [b]

(A b) averages that share at least one character within the column with no significant differences.

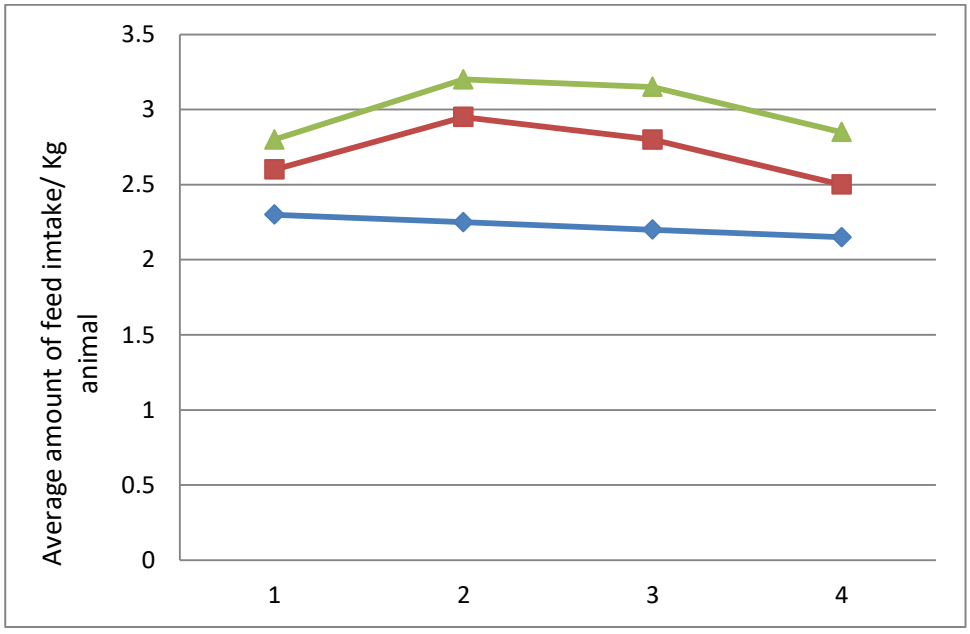

Figure (2) the average amount of feed intake.kg /animal/week.

Conclusions:

The results obtained from this study showed that the second group (seaweed can be used as 2% urea) and the third group (seaweed yield 3% urea) is safe and better than the first group. It was found that the animals fed on the seaweed without mixing with urea were less consumed and palatable compared with other groups fed on sea hay mixed with urea. The study is recommended to use sea hey to be mixed with urea (2-3%). The use of sea hay reduces the cost of production and also helps to eliminate the huge quantities that come out of the sea during the fall and winter and thus reduce the environmental pollution of the beaches taking into consideration that the feeding process Under the supervision of specialists in animal nutrition due to the seriousness of the use of urea without scientific grounds lead to poisoning of animals and mortality and we recommend the increase of scientific studies on the effect of urea on the products of the urea.

References:

Abdullah A, Ayad A. (1993). Study the improvement of the nutritional value of marine plants by adding urea and molasses in goat feed. A report from *the Center for Agricultural Research* Tripoli- Libya.

Hadjipanayiotou, M., Economides, S., Kyprianou, G., Antoniou, I., & Photiou, A. (1997). Feeding urea-treated barley straw to lactating Friesian cows. *Livestock Research for Rural Development*, *9*(3), 47-56.

Hsu, J. T,, Fahey, J. R., clark, J. H., Berger, L., & Merchen, N. (1991). Effect of ured and sodium bicarbonate sup lamentation of a high – fiber on nutrient digestion and ruminal characteristics of ceraunated sheep . *J.Anim. Sci* ., 69 : 1300 – 1311.

Thunhorst, R. L., Beltz, T. G., & Johnson, A. K. (2007). Glucocorticoids increase salt appetite by promoting water and sodium excretion. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*, *293*(3), R1444-R1451.

Saker, K. E., Fike, J. H., Veit, H., & Ward, D. L. (2004). Brown seaweed-(TascoTM) treated conserved forage enhances antioxidant status and immune function in heat-stressed wether lambs. *Journal of animal physiology and animal nutrition*, *88*(3-4), 122-130.

Owens, F. N., & Bergen, W. G. (1983). Nitrogen metabolism of ruminant animals: historical perspective, current understanding and future implications. *Journal of animal science*, *57*(suppl_2), 498-518.