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EVALUATION OF CORN SILAGE FROM DIFFERENT REGIONS IN EGYPT [30]

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ABSTRACT

The main objective of this study was to evaluate different samples of corn silage (Whole corn plant with ears) from different regions in Egypt to determine each sample has the highest nutritive value and nutrients digestibility and therefore reduce the feed cost, increase feed efficiency and probability of lactating dairy farms. Silage samples were collected from different four areas in Egypt; El-Salhya, El-Nobarya, El-Monofia and Ganakles. The study Included three field and laboratory work cores which were; chemical composition, *in-vitro* and *in-situ* evaluation studies.

The samples were analyzed for its chemical composition, Dry matter (DM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL). The silage samples were evaluated *in-vitro* and *in-situ*. *In-vitro* evaluation was conducted using gas production technic. Gas production (GP) was recorded at 0, 2, 4, 8, 16, 24 and 48 hours of incubation. The organic matter digestibility (OMD), short chain fatty acids (SCFA), and metabolizable energy (ME) were measured. The *in-situ* experiment, involved nylon bags containing silage samples from different regions were incubated in three fistulated Barki rams for 24h. Samples were taken out at 2, 4, 8, 12 and 24h of incubation. The obtained results indicated that the Ganakles silage ampel recorded the lowest ($P<0.01$) values of GP within the different times compared to others. The silage from El-Salhya had the highest ($P<0.01$) values for OMD and SCFA. The DMD of *in-situ* samples was significantly ($P<0.01$) increased within the different times of incubation with Al-Salhia silage samples, but the lowest significant values ($P<0.01$) were recorded with Al-Nobaria silage samples. Depending on *in-vitro* and *in-situ* results for silage type results, *in vitro* and *in-situ* for silage type from Al-Salhia area had a best characteristics of good silage and was chosen forever conducting lactation trial.

Key words: corn silage, evaluation, *in-vitro, in-situ*

INTRODUCTION

Sustainability of dairy sector is achieved by sustainable profitable milk production, and sustainable quality environment which emphasizes the need for integral solutions to sustainability problems in the livestock production sector. Perhaps, the biggest problem facing dairy profitability is the feeding cost. So, we will focus on this problem constrain the dairy sector sustainability. Feed is the largest single cost item for livestock and poultry production, accounting for 60%–70% of the total cost in most years (2008). Although energy, labor, and other inputs have increased, feed costs have increased anywhere from 40%–60% (depending on the species) in the last two years. To date, rising costs have largely been absorbed by livestock producers, often with significant financial loss. However, higher costs of production will ultimately have to be reflected in higher prices for meat and milk at retail counters in the United States and elsewhere. When analyzing the impact of escalating feed costs on animal farm, it was found that a variety of factors have contributed to higher feed grain prices as revolution of biofuel production. **John et al (2008) and Jim (2015)** showed that corn prices began increasing dramatically because of explosion in the production of corn ethanol plants started at 2006, also rising consumption of

meat and milk in developing countries escalating feed costs, milk consumption has rapidly increased, and the annual per capita consumption of milk in developing countries is projected to increase from 52 kg in 2005 through 2007 to 66 kg in 2030 and 76 kg in 2050 **(Alexandratos and Bruinsma, 2012),** and the environmental condition as drought also escalating feed costs, drought-induced crop yield loss is considered among the greatest losses in agriculture **(Lobell et al 2011).**

Salfer (2015) reported that the dairy profitability has been affected by high feed prices similar to other livestock species. 2009 was the lowest profitability year in history. Many producers lost in excess of $100/cow per month for several months. Year to year profit volatility has increased tremendously. Net return averaged $480/cow from 2000 to 2006 with a low of $268/cow in 2002 to $678/cow in 2005. From 2007 to 2013 net return averaged $354/cow with a range from $-189/cow in 2009 to $881/cow in 2007. For Beef Industry, the production costs have risen sharply in the cattle sector, primarily as a result of rising feed costs, **John et al (2008).**

In case of higher corn prices and subsequent increases in other grain prices strategies need to be implemented to reduce feed costs without disrupting the rumen environment such as feed more corn silage. Forages such as corn silage will become a natural choice as the primary forage in rations when corn grain is partially removed. Corn silage is low in protein and provides fermentable starch, energy, and relative amounts of effective fiber (depending on its particle size). As grain prices have increased since the 2006 harvest, forage utilization has increased by 5-10% on a DM basis, often with little or no decrease in milk yield **(Knapp, 2008).**

Allen (2001) reported that when feeding higher corn silage diets will allow dairy producers to feed decreasing corn diets with excellent performance. **Delaby et al (2009)** noted that when using 65% corn silage plus 5% alfalfa hay plus 30% concentrate in dairy ration he found that dairy cows consumed DMI 20Kg/d and produced 33.5 kg milk/d with 4% Fat. **Shahira et al (2008)** fed dairy cows on corn silage with different concentrations 25%, 50% 75% corn silage with 15g protected methionine. They found that milk production and fat were improved by 7.5 % for 75% corn silage and with supplement methionine detected higher milk fat and protein and reproductive performance**.**

The main objective of this study was to achieve dairy farming sustainability by corn silage supplementation as a percent of dry yellow corn to decrease feeding cost. The sub-objective was to evaluate fermentation parameters of different silage samples In-vitro and evaluate the in-Situ degradability of the different silage samples.

MATERIALS AND METHODS

Silage sampling plan

Silage samples (approximately 4 kg) were collected from four regions; El-Nobria and Ganakles which belong to El Beheirah Governorate, El-Salhia which belongs to Al Esmailia Governorate and El- Monofia governorate. Each sample was divided into two parts, the first part was frozen and other part was dried in a forced air oven at 60° C for 24 hours. The dried samples were ground to pass a 1mm sieve in a Wiley mill and used for chemical analysis and for *In-Vitro* and *In-Situ* trials.

2.2 Silage evaluation plan

The present study was carried out at two steps. The first was the *In-vitro* experiment and it was conducted in Regional Center for Food and Feed Lab., Giza Governorate, Egypt in March, 2017. The second was *In-Situ* experiment and conducted in King Marriott Research farm belong to Desert Research Center located in Alexandria Governorate, Egypt in April, 2017

2.1 Quality parameters of silage samples

The frozen samples were used to determine silage quality parameters. Samples of 50 g silage were mixed with 450 ml distilled water in food mixer for 5 minutes, then filtered using 4 layers of cheesecloths and withdrawn to a sample bottle and then stored at -20 °C ~~in~~ deep freezer until subsequent analysis. The pH values were measured immediately using pH Metter (Hannah's pen). The ammonia concentration (NH_3N) was determined according to **Conway (1962).** Total volatile fatty acids (VFA's) concentration was determined by steam distillation methods as described by **Warner (1964).**

2.2 *In-vitro*

In-vitro batch culture trial was applied according to procedures of **Menke and Steingass (1988)**, to compare the different silage samples. Rumen fluid was obtained from slaughterhouse

and it was collected from three steers. The collected rumen fluid was mixed and squeezed through 4 layers cheesecloth into a 1 liter bottle (1L) with an O_2 -free headspace and immediately transported to laboratory at 39°C where it was used as a source of inoculum. About 200 mg dry weights of samples were weighed into calibrated glass syringes of 100 ml. Each sample was tested in 3 replicates accompanied by blank vessels (no substrate). Rumen fluid was mixed with 200 ml buffer solution (Buffer A): Ammoniabicarbonate $NH_4(HCO_3)$, Sodium bicarbonate ($NaHCO_3$) + Buffer B: sodiumdihydrogen phosphate (Na_2HPO_4), anhydrous potassium dihydrogen phosphate KH_2PO_4, anhydrous magnesium sulfate heptahydrate extra pure ($MgSO_4.7H_2O$)+0.1 ml micro-mineral solution, 200 ml macro-mineral solution, and 1 ml Resazurin solution per 500 ml of distilled water. Carbon dioxide (CO_2) gas was flushed through the solution until the color turned. The syringes were pre warmed at 39°C before the injection of 30 ml of rumen fluid-buffer mixture into each syringe followed by incubation in a water bath at 39°C for 24h.

2.3 Total gas production determination

- SCFA (mmol/200 mg DM) = -0.00425 + 0.0222 * GP (Eq. 1).
- 1MJME = 0.4185 Mcal ME (Eq. 2).
- Where: The GP is net GP in mL from 200 mg of dry sample after 24 h of incubation, 2.2 mg/mL is a stoichiometric factor that expresses mg of C, H, and O required for the SCFA gas associated with production of 1 mL of gas.

2.4 *In-Situ* trial

DM disappearance for silage samples in the rumen was done according to **Mehrez and Orskov (1977).**

6.1 Animals, feeding and bags

Three mature Barki rams (60 kg and about one yearold) were used. Each animal was fitted with a rumen cannula (40 mm diameter) about two months before the experiment commenced. The animals were kept in individual pens and were fed *ad libitum* on alfalfa hay plus one Kg concentrate feed mixture (12% protein). The bags used in this experiment were made from of Dacron material, the number of holes per cm^2 was about 1940, the bags were made to assize of 8*5 cm.

2.6.2 *In-Situ* Procedures:

The in-situ DM degradation analysis was carried out according to the procedure described by **Mehrez and Orskov (1977)**. The silage samples were dried and grinded in Willy mille (3-mm sieve).Five g of silage samples were weighed into nylon bags and incubated in three rumen fistulated sheep for 0, 2, 4, 8, 12 and 24 h (three replicates for each time). On removal the nylon bags were thoroughly washed with cold running water until no further coloured liquid could be extruded, and dried at 60°C for 48 h. Dry matter (DM) losses for each incubation time were determined.

2.7 Statistical analysis

In-vitro studies results were analyzed according to one way statistical analysis system **(SAS) User's Guide (1998).** Separation among means was carried out by using Duncan multiple tests, (1955). According to the following model:

$$Y_{ij} = \mu + T_i + e_{ij},$$

Where: y_{ij}: represents observation, μ: the overall mean, T_i: effect of treatment (experimental group) and e_{ij}: experimental error.

While, *in-situ* results for rumen degradation kinetics for DM degradation data were calculated following the model proposed by **Ørskov and McDonald (1979)** and analyzed by using software of **SAS (1998)** non-linear regression procedure (PROC NLIN)

$$Y = a + b\ (1- e^{-ct}).$$

Where: Y = DM degradation in rumen at time (t),
a = Water soluble (or rapidly degraded) fraction (at T0),
b = the slowly degradable (or potentially degradable) fraction
c = Rate of degradation of (b), and t = Incubation time i.e. 2, 4, 6, 12 and 24hrs.

Following determination of this parameter, the effective degradability of DM was calculated using equation described by **Ørskov and McDonald (1979):**

$$ED = a + [(b \times c)/(c + k)]$$

The un-degradable fraction (*U*) was calculated as: U= 100 – (a+b). Effective degradability **(**ED**)** of DM, assuming constant rumen passage rates (k) of 0.02 h^{-1} for each ingredient.

RESULTS AND DISCUSSION

1. Chemical composition of the tested silage samples

The data of proximate chemical analysis of different silage samples and calculated nutritive values are presented in **Table (1).** The data showed that the values of DM, OM, ash, CP, NDF, lignin and GE are within the normal range for all silage samples (El-Salhya, El-Nobaria, El-Monofya and Ganakles) as reported in **Table (1).** However, the values of crude fiber (CF) for El-Nobaria and El-Monofya silage samples were out of the range reported by **Ali et al (2016)** (13.8-22.8%), Also the values of ADF contents for El-Nobaria, El-Monofya and Ganakles silage samples were higher than the range reported by **Nazier et al (2014)** and the values of calculated gross energy (GE) values for El-Nobaria, El-Monofya and Ganakles silage samples were lower than these values reported by **Hassanat et al (2013).** Based on the chemical composition data, it is interest to note that El-Salhya silage sample recorded the best values in most instance compared to the other samples and according the stated references in **Table (1).** The wide range of chemical composition results reported in **Table (1)** may be due to that the authors used a lot of number of samples, different strains, different maturity and different moisture and ash content. In this connection **Seglar (2003)** reported that there were a wide range of the chemical composition or silage quality due to some factors such as moisture %, maturity stage, crude protein%, ash%, PH, ammonia nitrogen and microbial counts.

Table 1. Chemical composition of the tested silage samples on DM basis.

Items	El-Salhya	El-Nobrya	El-Monofya	Ganakles	Normal Range	References
DM%*	35.4	30.09	28.2	29.7	19.2-48.1	**Ferreia and Mertens (2005)**
OM %*	96.27	96.49	95.9	96.06	90.4-96.9	**Ferreia and Mertens (2005)**
Ash %*	3.73	3.51	4.1	3.94	3.1 -9.6	**Ferreia and Mertens (2005)**
CP %*	7.8	8.3	7.5	6.1	5.7 -12.5	**Ferreia and Mertens (2005)**
CF%*	22.57	28.07	27.48	22.86	13.8 -22.8	**Ali et al (2016)**
NDF %*	52.8	65.4	56.9	55.6	20.7-65.9	**Nazir et al.(2014)**
ADF %*	31.8	41.8	38.5	37.4	15.2-33.4	**Nazir et al.2014**
Hemi Cellulose %*	21.03	23.48	18.4	18.2	15-23	**Vishler and Gabriella 2016**
Lignin %*	6.22	6.32	5.04	5.5	4.6-9.2	**Swift 2004**
GE cal/g*	4243	4115	4046	3907	4200	**Hassanat et al 2013**
TDN**	64.39	61.44	64.85	64.48	46.4-70	**Isabella et al 2007**

*determined according to **A.O.A.C. (1995)**

calculated according to **NRC (2001)

3.2 Characteristics of tested silage samples

The data of silage quality for different samples are presented in **Table (2).** According to **Oliveira et al (2017),** good corn silage has PH 3.6–4.1, so all our samples were within the PH normal range except Ganakles silage sample (4.28).Concerning ammonia N **Selgar (2003)** reported that good silage should have ammonia-N NH_3N (% of Total Nitrogen) <10% so all samples are normal range. **Wilkinson (1990)** cited that well-preserved silages should have an ammonia-N concentration <100 mg/ml So all different samples were in normal range. Total TVFA's ml mol/dl for El-Salhya and Ganakles samples were within normal range according to **Akila et al (2009),** who reported that the normal range concentration of TVFA's for whole corn silage was 2.25 - 2.55 mlmol/100ml.

Table 2. Silage quality parameters of diffrent samples

Parameters	El-Salhya	El-Nobrya	El-Monofya	Ganakles
PH	3.92	3.85	3.93	4.28
NH3-N %	0.59	0.52	0.71	0.76
Ammonia mg/100 ml	13.28	15.93	10.62	7.97
TVFA mmol/100 ml	2.55	1.28	1.66	2.3

3 The *In-vitro* evaluation of tested silage samples

3.1 Gas production

The data presented in **Table (3) and Figure (1)** showed that Ganakles samples recorded lowest significant (P=0.001) gas production at different times compared to the other samples (El-Salhya, El-Nobarya and El-Monofia). While no significant differences were recorded among El-Salhya, El-Nobarya and El-Monofia samples at different times. This may be due to Ganakles silage sample recorded lower fermentation characteristics and GE value compared to the other silage samples **(Table 3 and Figure 1).** In this connection **Bovera et al (2006)** found that the total accumulated gas after 48 hour for different silage samples were ranged from 140-180 ml/g DM.

Table 3. *In-vitro* Gas production (ml/1 g DM) at different times of incubation for different silage samples

Time	El-Salhia	El-Nobria	El-Monofia	Ganakles	SE
at 2 h.	22.96^{e}	20.97^{e}	25.39^{e}	14.38^{e}	3.34
at 4 h.	40.42^{d}	36.45^{d}	40.81^{d}	23.23^{d}	3.34
at 8 h.	53.55^{c}	65.19^{c}	44.00^{c}	28.00^{c}	3.34
at 16 h.	65.38^{c}	71.82^{c}	47.43^{c}	32.06^{c}	3.34
at 24 h.	149.58^{b}	146.97^{b}	131.27^{b}	118.31^{b}	3.34
at 48 h.	165.99^{a}	150.31^{a}	145.60^{a}	132.66^{a}	3.34
P Value	0.0003	0.0001	0.0001	0.0001	0.0001

Regarding to the effect of the incubation time, the data of **Table (3) and Figure (1)** showed that ther was gradual increase (P =0.0001) for gas production with time for all samples. These data agreed with **Calabro et al. (2007),** who founed that *In-vitro* gas production was increased gradualy with incresing time of icubation of *in-vitro* fermintation of corn silge. This finding can be assesed by **Blümmel and Orskov (1993),** who observed a positive correlation between DM disappearance and gas production.

3.2 *In-vitro* calculated parameters

The data of **Table (4)** showed calculated OMD, ME and SCFA for the different silage samples based on in-vitro gas production test. The data showed that El-Salhya and El-Nobria samples recorded significant (P=0.001) higher values of ME, OMD and SCFA values compared to El-Monofia and Ganakles results. Besides, El-Monofia recorded significant higher values of ME, OMD and SCFA than these of Ganakles samples. This data agreed with **Ali et al (2016),** who reported that *In-vitro* organic matter degradability of corn silage ranged between (70%-80%) after 32-72 hour of incubation. Also our data agreed with **Elghandour et al (2015),** they reported that calculated ME of corn silage were between 1.5–1.7 Mcal/kg DM when tested whole corn silage without concentrates by *in-vitro* method using gas production technique after 72 hour incubation time. But less than the values of the same author when they reported a calculated SCFA of corn as (3.23 mmol/g DM.)

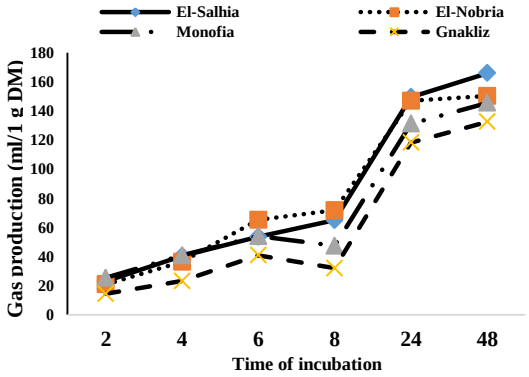

Fig. 1. Gas production accumulation at different times of *in-vitro* fermentation for the tested silage samples (ml/g DM)

Table 4. Calculated *in-vitro* ME, OMD and SCFA of the different silage samples

Areas	ME (Mcal/Kg DM)	OMD (%)	SCFA(mmol /g DM)
El-Salhia	1.60 ^{a}	76.39 ^{a}	0.659 ^{a}
El-Nobria	1.59 ^{a}	78.39 ^{a}	0.648 ^{a}
Monofia	1.49 ^{b}	72.04 ^{b}	0.578 ^{b}
Ganakles	1.38 ^{c}	63.43 ^{c}	0.521 ^{c}
SE	0.689	0.689	0.02
PV	0.0007	0.0001	0.0015

3.3 In-situ Evaluation of tested silage samples

3.3.1 Extent of DM degradability

The date of extant degradability of dry matter for the different silage samples are presented in **Table (5).** It could noticed that El-Salhia samples recorded the highest *in-Situ* degradability at different times 2, 4,8,16, and 24 hrs in most instance as

well as the mean. While Ganaklize sample recorded the lowest *in-Situ* dry matter degradability and the differences were significant at (P=0.001). As expected, the data indicated that *in-Situ* dry matter degradability significantly (P=0.001) increased with time of incubation. This data agreed with **Ali et al (2016)** who reported that the DMD of corn silage were increased with increasing of incubation time. Nevertheless, the present results of DM degradability for different silage samples disagree with those reported by result of **Jurjanz and Monteiles (2005)** who found that the *In-Situ* degradability of whole corn silage was 75% after 24 hrs of incubation. Also **Ali et al (2016)** reported that the average of *in-Situ* DM degradability was 52.5 % after 24 hrs. of incubation. Concerning the effect of time incubation, the data of **Table (5) and Figure (2**) revealed gradual increase with time for *In-Situ* DMD with time for all samples.

Table 5. Extent degradability (%) of In Situ DMD of silage samples at different time of incubation

Time	El-Salhia	El-Nobria	Monofia	Ganakles	SE	*P vlaue*
at 2 h	26.66	22.45	23.67	23.05	2.9	0.001
at 4 h	28.93	23.85	27.3	24.25	2.9	0.001
at 8 h	32.14	27.82	34.76	26.67	2.9	0.001
at 12 h	35.64	29.83	36.49	29.51	2.9	0.001
at 16 h	39.14	31.83	38.22	32.36	2.9	0.001
at 24 h	46.92	35.85	40.5	43.34	2.9	0.001

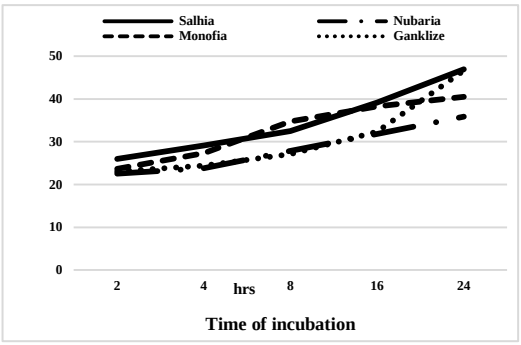

Fig. 2. Extent degradability of *In-Situ* dry matter of silage samples at different times of incubation.

3.3.2 Degradation rate of DM at different incubation times

As shown in **Table (6),** the rate of degradation for different silage samples started high (from 0 to 2 hrs. for all silage samples then gradually decreased in the following intervals. The highest degradation rate at 0 to 2 hrs was recorded for El-Salhya samples followed by El-Monofiea samples while the lowest degradation rate was recorded for El-Nubaria Silage samples. These data agreed with these of **Jurjanz and Monteil (2005**), who reported that the rate of degradability per hour of ensiled hole corn silage or fresh whole corn plant were 0.99 hrs by using *in-Situ* measurements carried out using four ruminal cannulated lactating multiparous Holstein cows. The animals were fed *adlibitum* a total mixed ration composed of corn silage, and sample bags were incubated for 1, 3, 6, 12, 24, and 48 hrs.

Table 6. Degradation rate (%) of *In-Situ* DMD at different interval times of silage samples.

Time interval	El-Salhia	El-Nubaria	El-Monofia	Ganklize
From 0h.-2h.	13.002	11.2741	11.8356	11.5254
From 2h.-4h.	1.57152	0.65226	1.81433	0.68124
From 4h.-8h.	0.83213	0.99296	1.86597	0.68124
From 8h.-12h.	0.83269	0.50131	0.4333	0.65211
From 12h.-16h.	0.83269	0.50131	0.4333	0.65211
From 16h.-24h.	0.97324	0.50131	0.28366	1.78949
Extent	34.63	28.38	32.89	29.93

3.3.3.3 *In-Situ* parameters of different silage samples

Table (7) showed the data of *in-Situ* ruminal kinetic parameters of different silage samples. the obtained results showed that there were numerical differences among samples in soluble fraction, rapidly degradable portion (a). El-Salhia sample was the highest one but El-Nobria sample was the lowest one, while highest slowly degradable fraction, potential degradability (b),were recorded for El-Nobria sample and the lowest value was recorded for El-Monofia sample . Moreover, it is worthy interest to note that the lowest un-degradable fraction (U) was recorded for El-Salhya sample while the highest un-degradable fraction (U) were highest in El-Monofia sample. Effective degradable dry matter (Eddm) was the same for all samples at 2% passage rate **(Table 7).** The present data disagreed with **Ali et al (2016)** who reported that average values for rumen un-degradable (U) fraction, degradation rate (c) effective rumen degradability (Eddm) at 2% passage rate a of maize silage samples were (16,42 and 53%, respectively). However the data agreed with them when they reported that potentially rumen degradable (a+b) fraction was 55%.Data also disagreed with **DiMarco et al**

(2005) who reported that soluble fraction (a) was in average 32%, the degradable fraction (b) 43% and the fractional degradation rate (c) 4.45%/h.

Table 7. Ruminal kinetic parameters of different silage samples.

Sample	a[1]	b[2]	U[3]	a+b	c[4]	Eddm[5] (K=0.02 h-1)
El-Salhia	23.59	42.71	33.70	66.30	0.03b	50.14
El-Nobria	13.81	50.85	35.33	64.67	0.05b	50.66
El-Monofia	16.21	39.23	44.56	55.44	0.13a	50.16

[1]a: Soluble fraction at zero time, [2]b: Slow degradable fraction,
[4]c: Passage rate at 2% /hr.' [3]U: un-degradable fraction.
[5]Eddm: Effective degradable dry mater

CONCLUSION

According to the previous result the best silage sample was El-Salhia because its chemical composition values were the best one (DM, OM, CF, NDF, CP and GE), good quality characteristics sample (PH, NH3-N and Ammonia), *In-Vitro* evaluation (gas production, ME and SCFA), *in-Situ* evaluation (Extant DMD and degradation rate of DM).

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دراسه تقيم عينات سيلاج أذره من مناطق مختلفه فى جمهوريه مصر العربيه

[30]

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الموجـــــــز

أجريت هذة الدراسه بهدف تقييم عينات سيلاج الاذره كامله الحبوب من عدة محافظات بجمهوريه مصر العربيه لتحديد اى العينات اعلى فى القيم الغذائية' والقيم الهضمية وذلك بهدف استخدامها لاحلال نسبه 10% من حبوب الاذره الجافه اضافه لعلائق بسيلاج الاذره وذلك لتقليل تكاليف تغذيه الابقار الحلابه وزيادة ربحيه المزارع كاحد اهم العناصر التى تساهم فى تحقيق الاستدامه فى قطاع مزارع الالبان.

تمت دراسه التقييم لعينات سيلاج الاذره على ثلاثه مراحل: المرحله الاولى التحليل الكيماوى وتقدير جودة التخمر والمرحله الثانيه: مرحلة الهضم المعملى (in–vitro)، المرحلة الثالثه مرحله الهضم فى الاغنام باستخدام fistula (in–situ)

اشارت النتائج المتحصل عليها من مرحله الهضم المعملى الى زياده فى انتاج الغاز مع زياده وقت التحضين ولكن لوحظ انخفاض معنوى فى انتاج الغاز فى عينه سيلاج منطقه جناكليز، بينما لم تكن هناك فروق معنويه فى انتاج الغاز بين عينات سيلاج مناطق الصالحيه والنوباريه والمنوفيه.كما اوضحت النتائج ان هناك ارتفاع معنوى فى قيم الطاقه المهضومه والماده العضويه المهضومه والاحماض الدهنيه قصيره السلسله لعينة منطقة الصالحيه وانخفاض معنوى فى الطاقه المهضومه فى عينه سيلاج منطقه جناكليز. كما اشارت النتائج المتحصل عليها من مرحله الهضم فى كرش الاغنام باستخدام الفاستيولا الى ان هضم الماده العضويه لعينات سيلاج الاذره كانت اعلى ارتفاعا فى عينه منطقه الصالحيه عند اوقات 2 و 4 و8 و16 و24 ساعه تحضين، بينما سجلت النوباريه اقل القيم هضما للماده العضويه.

وعندما تمت دراسه عوامل النشاط الكرشى لمختلف عينات السيلاج من مختلف المناطق فقد وجد ان هناك فروق رقميه فى الجزء سريع الهضم من مادة العلف حيث كانت عينه الصالحيه هى اعلى قيمة والنوباريه اقل قيمة وعند دراسه الجزء بطئ الهضم من مادة العلف وجد ان عينه منطقه النوباريه كانت اعلى عينه فى هذا الجزء والمنوفيه هى اقل عينه وعند دراسه الجزء غير المهضوم من ماده العلف فقد وجد ان اقل عينه فى الجزء غير المهضوم كانت عينه الصالحيه وأعلى عينه هى عينه منطقة المنوفيه. وعند قياس هضم الماده الجافه الفعال عند معدل مرور 2% كانت النتائج متساوية لكل العينات من مختلف المناطق.

طبقا لنتائج الدراسه فان عينه الصالحيه هى احسن عينه سيلاج اذره نظرا لانها اعلى قيم تركيب كيماوى (ماده جافه– ماده عضويه– ألياف خام– الياف متعادله– بروتين خام– طاقه كليه) وأعلى نواتج تخمر (امونيا– نيتروجين امونيا– حموضه) وأحسن قيم هضم معملى (انتاج غاز– طاقه مهضومه– احماض دهنيه طياره قصيره السلسله) واعلى قيم هضم فى كرش الاغنام باستخدام fistula (معدل هضم – هضم المادة الجافه).

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