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# PERFORMANCE OF GOATS FED DRIED ORANGE AND CITRUS PULPS AS ENERRGY SOURCE. 1– IMPACT OF FEEDING DRIED ORANGE OR CITRUS PULPS ON MILK PRODUCTION AND COMPOSITION

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## SUMMARY

The present study was carried out to find out if their any deferent impact of using dried orange and citrus pulps as energy source on the performance, milk production, some rumen and blood parameters of Zaraibi does. The animals averaged 4 years old and weighed on average 45 kg. Fifteen animals were randomly divided into three similar groups (five animals each). The experiment was started at the last 8 weeks of gestation until three months after suckling period. The experimental rations were: R1(control ration ) consists of 50 % hay and 50 % concentrate which contain yellow corn grain . Does in the experimental rations were fed 50 % of DOP( R2) and 50 % of DCP( R3) as partial replacement to yellow corn grains in the ration. At the end of the experiment the economic efficiency value was calculated. The Results could be summarized as follows: Feeding dried orange and citrus pulps increased nutrients digestibility (CP, CF, EE and NFE) and nutritive values as TDN, DCP compared to control ration. Dried orange and citrus pulp decreased total lipids and cholesterol .Also, increased total plasma protein and globulin significantly ( $p < 0.05$) compared to the control group .Also, using dried citrus or orange pulps improved total milk yield and feed efficiency in all supplemented groups. It could be recommended that dried orange and citrus pulps( Oranges, tangerines, lemons) can safely replace a part of the energy sources included in rations at 50 % in goats ration to reduce the feed cost and improve the performance and milk production of goats.

***Keywords:*** *Dried orange pulp , citrus pulp, corn grains, performance , economic efficiency and goats.*

## INTRODUCTION

Conventional feedstuffs are often expensive and therefore the utilization of agro-industrial by-products as feedstuffs may be economically worthwhile Alnaimy *et al. (*2017). The relatively high prices of concentrates and its ingredients in Egypt are the major problem in animal production. At the same time, citrus by–products may be playing an important role in solving the problem of energy gap in ruminants rations in Egypt (Bakr, 2020)

More studies concluded that up to 50 % of dietary corn grain could be replaced by dried orange or citrus pulps (Oranges, tangerines, lemons) without any disorders in health , digestibility , performance in ruminant.

Orange pulp is the dried residue of peel, pulp and seeds of oranges. But citrus pulp is the solid residue that remains after fresh fruits (Oranges, tangerines, lemons) are squeezed into juice. Essential citric oil is used in traditional medicine as an anti-inflammatory agent, antimicrobial, antifungal and anti-cancer. One or more of these contents may have anti-inflammatory effects of lemon essential oils as linalool, linalylate, limonene, and alpha-pinene. Especially in pregnancy, nursing and radiation exposure, lemon essential oil is poisonous (Al-Qudah *et al*. 2018).

Fresh citrus pulp has a natural acidity but it still is a perishable product due to its high content of moisture and soluble sugars and may quickly sour, ferment and release sludge hazardous to the environment. Dried or mash pelleted citrus pulp is one of the most desirable energy feeds and it may be considered in feeding programs as being; a dry carbohydrate concentrate with high TDN content averaging about 74%; it represents a bulk energy feed and having above-average palatability for cattle. As a general rule, 40-45% of the ground snapped corn in a dairy ration can be replaced by dried citrus

pulp as mash or pellets (Alnaimy *et al.* 2017). Moreover, Allam *et al.* (2011) recommended that corn grains could be replaced by 50% dried orange pulp as alternative energy source in growing lambs rations to reduce the feed cost without any negative effect on animal performance and health.

This study was designed to investigate if there any different effect between using dried orange or citrus pulps as a partial energy source on the performance of goat does and their milk production.

## MATERIALS AND METHODS

### *Feeding Trials:*

#### *Experimental animals:*

Fifteen Zaraibi does at the last 8 weeks of gestation were used until three months after suckling period. Does averaged 45kg in live body weight were divided into 3 similar groups according to their weight, age and parity. Each group was kept in a separate shaded pen. The experimental period lasted nearly five months (from November to April). Does and all born kids were kept under routine veterinary supervision throughout this experiment.

#### *Experimental rations:*

Does were fed control ration (R1) contained 50% concentrate feed mixture (CFM) and 50% alfalfa hay. Does in the experimental groups were fed 50 % of sun dried orange pulp (DOP ) ( R2) or 50 % of sun dried citrus pulp (DCP) (R3) as partial replacement to yellow corn grains in the ration.

Fresh orange or citrus juice by – product containing peel , pulp and seeds were collected from plant of food industry and shipped for drying to produce DOP and DCP . Does in all groups were received their nutrient requirements according to (NRC, 2007) twice daily at 8-am and 3-pm. Water was always available. The chemical analysis of the experimental rations was carried out according to the AOAC (1996) in the laboratories of Animal Nutrition, Animal Production Department, Faculty of Agriculture, Cairo University.

Feed ingredients used in the experimental rations were showed in Table (1). And the Chemical analysis of feed ingredients and rations are illustrates in Table (2).

**Table (1): Constituents of the experimental rations**.

| Ingredient, % | Concentrate feed mixture ( CFM) | | |
|---|---|---|---|
| | R1 | R2 | R3 |
| Yellow corn grain | 30 | 15 | 15 |
| Dried orange pulp | 0 | 15 | - |
| Dried citrus pulp | 0 | - | 15 |
| Wheat bran | 30 | 30 | 30 |
| Un-decorticated cotton seed | 20 | 20 | 20 |
| Soya bean meal | 15 | 15 | 15 |
| Common salt | 1 | 1 | 1 |
| Di-calcium phosphate | 1.5 | 1.5 | 1.5 |
| Minerals and vitamins mixture | 2.5 | 2.5 | 2.5 |
| Total | 100 | 100 | 100 |

*Mineral and vitamins mixture provided ( per kg of premix ) ; 185 g of di calcium phosphate , 54 g of potassium sulfate, 24.8 g of manganese sulfate , 10 g of zinc oxide,21 g of sulphur , 43.5 g of magnesium sulfate , 50.2 g of ferrous sulfate, 11.9 g of copper sulfate, 50 mg of molasses, 8 mg of pantothianic acid , 7 mg of vitamin $B_1$ , 3 mg of vitamin $B_6$ , 53 mg of vitamin $B_2$ , 6400 IU of vitamin A, 64 IU of vitamin E, 6000 IU of vitamin $D_3$ and sodium chloride up to 1.*

**Table (2): Chemical analysis of feed ingredients and the experimental rations.**

| Item | Chemical composition % , on DM basis | | | | | | |
|---|---|---|---|---|---|---|---|
| | DM | OM | CP | CF | EE | NFE | Ash |
| Alfalfa Hay | 91 | 90 | 12.5 | 22 | 2.6 | 53.4 | 10 |
| Dried orange pulp( DOP) | 90.5 | 92.5 | 6.90 | 12.4 | 4.4 | 68.8 | 7.5 |
| Dried citrus pulp ( DCP) | 86.8 | 92 | 6.30 | 12.6 | 3.7 | 69.4 | 8 |
| CFM1 | 86.8 | 90 | 17.90 | 16 | 6.6 | 49.5 | 10 |
| CFM2 | 86.8 | 92 | 17.78 | 18.4 | 6.0 | 49.82 | 8 |
| CFM3 | 86.8 | 89.6 | 17.82 | 20.5 | 7.0 | 46.28 | 8.4 |
| Ration 1 | 88.9 | 90 | 15.20 | 19 | 4.6 | 51.2 | 10 |
| Ration 2 | 88.9 | 91 | 15.14 | 20.2 | 4.3 | 51.36 | 9 |
| Ration 3 | 88.6 | 89.8 | 15.16 | 21.25 | 4.8 | 49.59 | 9.2 |

***Determination of essential oils:***

Triplicate samples of (400 gm each) of air dried orange pulp and citrus pulp were separated by water distillation for 5 – 6 hr. according to the method of Guenther (1961). Analysis of the oil was carried out using GLC chromatography.

***Digestibility Trials:***

***Feeds and feces sampling and analysis***

Nine mature bucks (weighed 40 kg) were randomly selected from the station herd and used in digestion trials (3 for each group) for 21 days, 14 days as a preliminary period and 7- days as a collection period. Animals were kept in metabolic cage and fed 90 % their rations, which provided their maintenance requirements. Rations were received twice daily in equal parts at 8.00 and 17.00 hr. and water was freely available. During the collection period feces and urine were collected daily and samples representing tenth of the voided feces were taken just after collection. Feces samples were dried at 60 ° C /24 hrs in a hot air oven. At the end of the collection period, dried samples of feed and feces were finely grounded to pass through 1 mm sieve and kept in tight plastic containers for chemical analysis according to the methods of the AOAC (1996).

***Rumen liquor sampling and analysis*:**

Rumen fluid samples were taken individually from animals at the end of the digestibility trials before feeding (zero time), then at 3 and 6 hrs. post feeding using a stomach tube . Samples were filtered through four layers of surgical gauze, to determined ruminal pH immediately using digital pH meter. The samples were kept frozen for testing of various ruminal parameters determination. Ruminal ammonia – N concentration was determined according to Conway (1963) method, while the total VFA s concentration was determined according to Warner (1964). The microbial protein was measured by sodium tungsten method according to Shultz and Shultz (1970).

***Blood sampling:***

Blood samples were collected biweekly from the jugular vein before feeding at 8 – 9 a. m. over the last 2 months of gestation until 3 months of lactation to avoid diurnal variation in the blood chemistry as stated by Thompson and Proctor (1984). The blood samples were centrifuged at 3000 r. p. m. for 15 minutes , and then blood plasma was separated into polypropylene tubes and stored at – 18° C until analysis for total proteins and albumin contents according to Doumas *et al*. ( 1971) , respectively. Globulin value was calculated as the difference between total protein and corresponding value of albumin. . Plasma cholesterol (mg/dl) was determined according to the method described by Richmond (1973). Plasma total lipids were ( mg/dl )determined according to the method described by Zollner and Kirsch ( 1962) .Plasma (ALT) Alanine Amino Transaminase and (AST) Asperate Transaminase ( U/ml) were determined according to the method described by Retiman and Frankel (1957)

***Milk yield:***

After seven days of parturition the milk yield was individually measured biweekly for each doe once on Tuesday over the28- weeks period. The does were hand–milked to ensure stripping of the udder. Milk yield was recorded individually. Composite samples were immediately entered for chemical analysis.

***Chemical composition of milk:***

Milk samples from does were chemically analyzed to determine fat, protein, total solids and ash percentages. The total solids were determined by drying 10 ml milk sample to constant weight at 100 °C for 3 hr. according to AOAC (1996). Ash was determined by evaporating 10 ml milk (put in crucibles containing ash less filter paper 0, dryness and ashing in a muffle furnance at 600° C for 2 hr .according to AOAC (1996).

Fat was determined by the classical Gerber method in duplicated with assistance of 90 % $H_2 SO_4$ and Amyl alcohol (Ling, 1963). Total nitrogen was determined by micro Kildahl procedure AOAC (1996), the factor 6.38 was used to calculate milk protein. Solid not fat (SNF) was obtained by difference where, SNF= TS – Fat. Cholesterol content was determined calorimetrically according to Pantulu *et al* (1975). Calcium and iron were determined in ash according to Jackson (1958) using Atomic absorption spectrophotometer.

***Economic efficiency:***

The economic efficiency value was calculated.

Out put = price of total milk consumed during suckling period + price of total live body weight of kids.

Input **=** total feed cost / goat.

Net revenue = output – input.

$$\text{Economic efficiency} = \frac{\text{Net revenue}}{\text{Total feed cost}}$$

Different prices of the experimental diets were calculated according to the current prices of the ingredients for different experimental rations .

***Statistics Analysis:***

The obtained data were analyzed using the general linear model procedure of SAS (2001), as the following model:

$$Yij = \mu + Ti + Eij$$

Where:

Yij = Observed value of a given dependent variable.
Ti = The effect of treatments.
Eij = The experimental random error.
μ = general mean.

Significant differences between means were separated by Duncan's multiple range test (Duncan, 1955)

## RESULTS AND DISCUSSION

***The analysis of essential oils in medicinal herbs:***

The analysis of the essential oil of the orange and citrus pulps are presented in Table (3)**.** Citrus essential oils consists of some major biologically active compounds like limonene, β- Pinene , Citral, β-myrcen, γ-Terpinen, β- phellandrene and β- linalool .Citrus pulps contain less limonene 83.15% than orange pulp 94.46% , but citrus pulp contain more than 20 times of V- Trepinen , β - Pinene, seven times of citral and three times of β - citral than orange pulp. These results were in harmony with Bora *et al* ., (2020) who recorded that Citrus essential oils consists of β- Pinene , β-myrcen ,*d*- limonine and linalool belongs to the mono-terpenes , monoterpene aldehyde and sesquiterpenes group. These compounds possess several health beneficial properties like anti oxidant , anti-inflammatory and anticancer.

**Table (3): The constituents of essential oils in orange and citrus pulps.**

| No. | Components | % in orange pulps | % in citrus pulp |
|---|---|---|---|
| 1 | Limonene | 94.46 | 83.15 |
| 2 | γ-Terpinen | 0.301 | 7.057 |
| 3 | β- Pinene | 0.088 | 2.152 |
| 4 | Citral | 0.316 | 2.134 |
| 5 | β- Citral | 0.303 | 0.982 |
| 6 | β-myrcen | 1.972 | 2.410 |
| 7 | α – pinene | 0.834 | 0.927 |
| 8 | β- phellandrene | 0.763 | 0.635 |
| 9 | β- linalool | 0.341 | 0.310 |
| 10 | Eremophilene | 0.327 | 0.124 |
| 11 | Octanal | 0.295 | 0.119 |

***Nutrients digestibility and nutritive value of experimental rations:***

The results in Table (4) showed that using dried citrus or orange pulps increased all nutrient digestibility and nutritive value as TDN than control ration by (69.76 – 71.57 ) for CP , (62.03–65.92 ) for CF and (67.00–69.73 ) for NFE . Results showed significant higher values of TDN in the tested rations than the control group. These results are in harmony with those observed by Allam *et al.* (2011) which found that the improvement of CF digestibility might be due to the fact that DOP contains a high concentration of pectin leading to a fast degradation in rumen and releasing energy for a rapid microbial growth which produces lesser lactate than starch**.**

In the same time R3 tended to have slightly higher, but not significant difference in nutritive value as DCP compared with control group and R2. This might be reflect that using dried citrus or orange pulps can be useful as alternative source of energy without negative effect on the nutrients digestibility, because of containing orange and citrus pulps a high level of readily fermentable carbohydrates ( pectin ) which could be used as a replacer for starch (Caparra *et al* ., 2007 and Allam *et al.*, 2011) .

**Table (4): Nutrient digestibility and nutritive value (% DM basis) of the experiment rations.**

| | Experimental ration | | | |
|---|---|---|---|---|
| Item | R1 | R2 | R3 | SEM |
| DM | 59.70 | 60.20 | 61.02 | 0.921 |
| OM | 61.53 | 62.03 | 61.23 | 0.873 |
| CP | 69.76 | 70.61 | 71.57 | 0.865 |
| EE | 74.39 | 75.46 | 75.80 | 0.891 |
| CF | $62.03^{b}$ | $62.65^{b}$ | $65.92^{a}$ | 0.860 |
| NFE | 67.00 | 69.10 | 69.73 | 0.768 |
| TDN | $63.49^{c}$ | $65.33^{b}$ | $66.63^{a}$ | 0.510 |
| DCP | 10.60 | 10.69 | 10.85 | 0.103 |

*a,b,c,.. means on the same row with different superscript are significantly different ($p < 0.05$ )*

***Rumen parameters:***

Results in Table (5) showed that ruminal pH values and Ammonia – N concentrations indicated that the mean differences in pH value and ammonia–N concentration between treatments were not significant. The ruminal $NH_3$-N concentration increased at 3 hrs post feeding, but it decreased at 6 hrs post feeding for all treatments.

Using Dried citrus or orange pulps improved the volatile fatty acids concentrations (meq/ 100 ml) which indicate that dried citrus and orange pulps are better energy source than corn grain for rumen micro- organisms , promoting a higher concentration of total volatile fatty acids.

Data showed a significant decrease ($P < 0.05$ ) of overall means value of microbial protein compared with control group .The lowest value was for R3 followed byR2**.**The decrease of microbial protein with groups fed R2 , R3 may be due to adverse ( an antimicrobial ) effect of orange and citrus pulps on microbial protein synthesis in the rumen .

However results indicate that using dried citrus or orange pulps can be used as partial corn replacement in ruminant rations without negative effect on the health.

**Table (5): Effect of experimental rations on rumen liquor.**

| Item | Experimental rations | | | | |
|---|---|---|---|---|---|
| | Time | R1 | R2 | R3 | SEM |
| pH values | 0 | 6.50 | 6.48 | 6.70 | |
| | 3 | 5.90 | 6.20 | 5.60 | |
| | 6 | 6.30 | 6.35 | 5.90 | |
| | Mean | 6.23 | 6.34 | 6.07 | 0.097 |
| Ammonia–N (mg/ 100 ml) | 0 | 27.70 | 22. 80 | 24.30 | |
| | 3 | 34.80 | 35.10 | 36.30 | |
| | 6 | 29.87 | 31. 50 | 31.70 | |
| | Mean | 30.79 | 29.80 | 30.2 | 0.810 |
| Total VFAs (meq/100ml) | 0 | 9.20 | 9.50 | 10.20 | |
| | 3 | 10.50 | 10.80 | 11.20 | |
| | 6 | 8.90 | 9.20 | 9.80 | |
| | Mean | 9.53 | 9.83 | 10.40 | 0.351 |
| Microbial protein (mg/ 100 ml.) | 0 | $256^{a}$ | $248^{b}$ | $240^{c}$ | 4.210 |
| | 3 | $300^{a}$ | $285^{b}$ | $280^{c}$ | 4.827 |
| | 6 | $276^{a}$ | $260^{b}$ | $250^{c}$ | 6.694 |
| | Mean | $277.3^{a}$ | $264.3^{b}$ | $256.6^{c}$ | 5.231 |

*a,b,c,.. means on the same row with different superscript are significantly different (P < 0.05 )*

***Blood parameters:***

Data in Table (6) showed no significant difference for ALT and AST enzymes. But using dried citrus or orange pulps decreased cholesterol, the best effect was 143 mg / dl for R3 followed by R2 , compared to control group .these results are in harmony with those observed by Al-Qudah (2018) who found that eating Lemon Peel Can Reduce Cholesterol effectively , this is not because of lemon peel pectin level, but because of various active ingredients in the peel.

Dried citrus or orange pulps decreased total lipid and increase total protein and albumin with a significant difference (P< 0.05) compared to control group. .Also, globulin level showed a higher significant difference (p < 0.05) for R3 followed byR2. This increase in globulin with citrus and orange pulps due to their component which contained steroidal flavonoids which stimulate the normal secretion of cortisone, meanwhile seventy percent from this cortisone bind with globulin. El-Elaime, (2007).

**Table (6): Mean values of blood constituents recorded for experimental goats.**

| Item | Total protein | Albumin | Globulin | Total lipid | Cholesterol | ALT | AST |
|---|---|---|---|---|---|---|---|
| R1 | $7.4^{b}$ | $3.6^{b}$ | $3.8^{b}$ | $380^{a}$ | $162^{a}$ | 18 | 38 |
| R2 | $8.1^{a}$ | $3.9^{a}$ | $4.2^{a}$ | $370^{b}$ | $151^{b}$ | 18.2 | 37.9 |
| R3 | $8.3^{a}$ | $4.0^{a}$ | $4.3^{a}$ | $366^{c}$ | $143^{c}$ | 18.1 | 38 |
| SEM | 0.190 | 0.136 | 0.138 | 6.29 | 2.16 | 0.214 | 0.120 |

*a,b,c,.. means on the same row with different superscript are significantly different (P< 0.05 )*

***Milk yield:***

Using dried citrus or orange pulps showed better daily milk production compared with control ration. The average daily milk yield was 1.43, 1.49 and 1.52 for R1, R2 and R3 respectively, during 12 weeks of lactation (Figure 1).

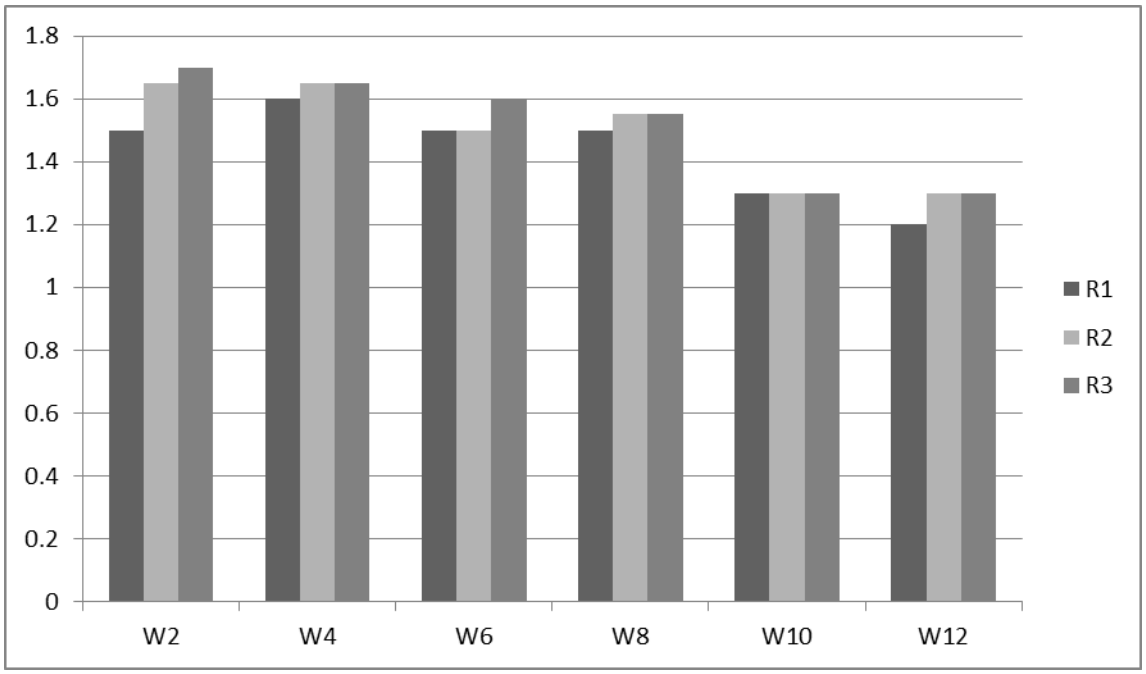


**Figure (1): The effect of experimental rations on daily milk yield (kg/day) during suckling period.**

Data of total milk yield of goats production are summarized in Figure (2). Using dried citrus or orange pulps increased total milk yield compared with control group. The effect was the highest for R2 followed by R3 compared with control group. These results are in harmony with Allam *et al*. (2020) who found an improvement in milk yield of Holstein cows fed rations containing DOP.

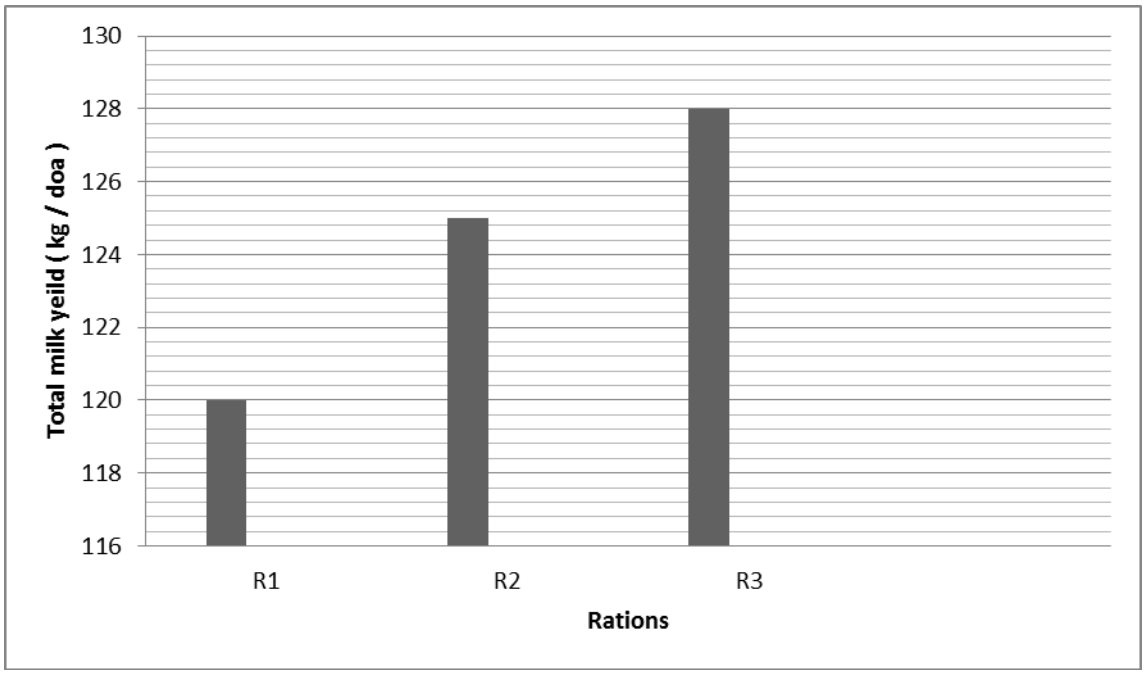


**Figure (2): The effect of experimental rations on total milk yield (kg/day) during three months suckling period.**

***Milk composition:***

Data presented in Table (7) showed no significant differences detected for TS, fat, SNF, CP, lactose and ash content. Using dried citrus or orange pulps decreased the cholesterol content of goats milk with a

significant difference ($p < 0.05$) compared with the control group. The best effect was 21 mg /100 ml for R3 followed by R2, compared with the control group.

Generally, it could be noticed that no significant deferens effect for citrus or orange pulps groups on milk composition comparing the control group. . These results are in harmony with **Alnaimy *et al.*, (2017)** who found that partial or total substitution of corn or barley grain by dried orange pulp (DOP) or dried lemon pulp (DLP) had no negative effects on milk composition or fat content of Friesian dairy cattle. While (**Bakr 2020 and Allam *et al.*, 2020**) who found that the inclusion of DCP in lactating cows rations significantly affect milk composition by decreasing milk fat. Also, data showed significant improvement of calcium and iron contents. This improvement might be due to the fact that DCP and DOP are rich in iron and calcium as mentioned by Czech *et al* . (2020) who found that both the pulp and the peel of citrus fruits are valuable sources of macro- and micronutrients. Oranges riches in iron and copper, while lime can be a source of calcium, zinc, sodium and specially potassium.

**Table (7): Effect of experimental rations on milk composition.**

| | Experimental rations | | | |
|---|---|---|---|---|
| Milk composition% | R1 | R2 | R3 | SEM |
| TS | 12.11 | 12.34 | 12.49 | 0.005 |
| Fat | 3.40 | 3.50 | 3.50 | 0.010 |
| SNF | 8.71 | 8.84 | 8.99 | 0.012 |
| CP | 3.41 | 3.42 | 3.56 | 0.004 |
| Lactose | 4.50 | 4.60 | 4.60 | 0.001 |
| Ash | 0.80 | 0.82 | 0.83 | 0.001 |
| Cholesterol (mg/100 ml) | $28^{a}$ | $26^{b}$ | $21^{c}$ | 1.801 |
| Ca (gm/1000 ml) | 1.20 | 1.51 | 1.64 | 0.230 |
| Fe (mg /1000 ml) | 0.50 | 0.76 | 0.75 | 0.140 |

*a,b,c,.. means on the same row with different superscript are significantly different ( $p < 0.05$ )*

***Economic evaluation:***

Data of economic evaluation of goats production are summarized in Table (8). Using dried citrus or orange pulps improved economic efficiency and relative economic efficiency of dams. The effect was highest for R2 followed by R3 compared with control group being 113.15 and 111.76, respectively.

**Table (8): Economic evaluation of the experimental rations.**

| | Experimental rations | | |
|---|---|---|---|
| Item | R1 | R2 | R3 |
| Total feed intake ( as DM), kg/ doe during last 2 months of gestation | 70 | 72 | 74 |
| Total feed intake ( as DM), kg/ doe during suckling period (3 months ) | 122 | 124 | 130 |
| Total feed intake | 192 | 196 | 204 |
| Total feed cost / goat( L.E.) | 729.6 | 686 | 714 |
| Average of total LBW / goat litter | 20 | 21 | 21 |
| Price of total LBW( L.E.) | 1200 | 1260 | 1260 |
| Average of total milk yield during suckling period. | 120 | 125 | 128 |
| Price of total milk consumed | 1200 | 1250 | 1280 |
| Total revenue | 2400 | 2510 | 2540 |
| Net revenue | 1670.4 | 1824 | 1826 |
| Economic efficiency ( LE ) | 2.29 | 2.66 | 2.56 |
| Relative Economic efficiency | 100 | 116.16 | 111.79 |

*Market price of kg live body weight for the small kids is(80 LE)*
*Market prices were as follow: Total concentrate mixture were 4500LE, alfalfa hay was 3000LE , peppermint 5LE/kg*

$$\textit{Economic efficiency} = \frac{\textit{Net revenue}}{\textit{Total feed cost}}$$

Finally its worth to know that the price of CFM contained either DCP or DOP will be reduced about 500 LE per ton.

## CONCLOSION

Referring to the obtained results, it is recommended that using dried citrus or orange pulps in goats ration to could improve milk yield, feed efficiency and economic efficiency.

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## الأداء الانتاجى للماعز المغذاة على مخلفات تصنيع البرتقال المجفف أو الحمضيات الجافة كمصدر للطاقة ، 1- تأثير تغذية مخلفات البرتقال المجفف أو الحمضيات الجافة على إنتاج اللبن وتركيبه

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اجريت هذة الدراسة بكلية الزراعة جامعة القاهرة بهدف تقييم استخدام مخلفات تصنيع البرتقال و مخلفات تصنيع الحمضيات الجافة ( برتقال وليمون و يوسفى ) كمصدر بديل للطاقه باحلالها محل 50 % من الذرة فى العلائق والتى تنقسم الى عليقة الكنترول المحتويه على الذرة و العليقة الثانيه المكونه من عليقة الكنترول باحلال 50 مخلفات تصنيع البرتقال الجافة محل 50 % من الذرة بها والعليقة الثالثة المكونه من عليقة الكنترول بالاضافه الى احلال مخلفات تصنيع الحمضيات الجافة محل 50 % من الذرة بها وذلك على الاداء الانتاجى لعدد 15 من اناث الماعز الزرايبى ( متوسط عمرها 4 سنوات و متوسط وزنها 45 كجم ) من حيث انتاج اللبن و مكوناته و مواصفات الدم و سائل الكرش و الكفاءة الاقتصادية. وقد اظهرت النتائج ان اضافة مخلفات تصنيع البرتقال أو مخلفات تصنيع الحمضيات الجافة ادت الى زيادة القيم الغذائية للبروتين الخام والالياف الخام و مستخلص الاثير والمستخلص الخالى من الازوت ) مقارنة بعليقة الكنترول . كما اظهرت النتائج ان اضافة مخلفات تصنيع البرتقال و مخلفات تصنيع الحمضيات الجافة الى العلائق ادت الى تحسن فى القيمة الغذائية كمركبات مهضومة كلية وبروتين مهضوم. كما ادت الى خفض كوليستيرول الدم والدهون الثلاثية و زيادة كلا من البروتين الكلى و الجلوبيولين بدرجه معنوية مقارنه بعليقة الكنترول. كما ادت الى تحسن معدل انتاج اللبن و مكوناته والى تحسن فى الكفاءة الاقتصادية مقارنة بعليقة الكنترول. وعلى ذلك نوصى باحلال مخلفات تصنيع البرتقال و مخلفات تصنيع الحمضيات الجافة كمصدر للطاقة محل 50 % من الذرة فى عليقة الماعز لانها تؤثر ايجابيا على ادائها الانتاجى من حيث انتاج اللبن و مكوناته و مواصفات الدم و سائل الكرش و الكفاءة الاقتصادية.