The aim of this study was to investigate the effect of different levels of common crop residues ensiled with citrus pulp and evaluation the silages containing the best ratio of crop residues and citrus pulp only or with CFM by sheep. The experimental work was conducted at Animal Nutrition Unit of Ismaillia (Animal Production Research Institute), Agricultural Research Center. The chemical analysis were carried out in Faculty of Agriculture of Ismaillia, Suez Canal University, Egypt. Four chopped crop residues (rice straw, corn stalks, bean straw and wheat straw) and citrus pulp were ensiled in four ratios 10 : 90, 15 : 85, 20 : 80 and 25 : 75. Silages was evaluated by silage quality, IVDMD, IVOMD, ISDMD and ISOMD in the 1st experiment. Palatability, digestibility coefficients nutritive values, N-balance and rumen parameters were carried out to evaluate four silages as 20% rice straw + 80% citrus pulp (RSS), 20% corn stalks + 80% citrus pulp (CSS), 20% bean straw + 80% citrus pulp (BSS), and 20% wheat straw + 80% citrus pulp (WSS) alone (in the 2nd experiment) or mixtures of CFM as 1.5% from LBW and silages ad lib in four rations (in the 3rd experiment) as RI (CFM + RSS), R2 (CFM + CSS), R3 (CFM + BSS) and R4 (CFM + WSS) using 12 mature rams (56 kg LBW) in a complete randomized design. The digestion coefficients of nutrients and nutritive values of silages were determined by differences between mixtures of silage + CFM and silage alone for determined associative effect. The main results can be summarized as the follows:

1- The chemical composition of crop residues indicated that, ash content ranged from 9.58% of Corn stalks to 17.7% of Rice straw, The organic matter (OM) ranged from 82.23% of Rice straw to 90.42% of Corn stalks, crude fiber (CF) ranged from 31.83 of wheat straw to 46.71 of bean straw and crude protein (CP) ranged from 3.56%of Rice straw to 6.51% of bean straw. The DM, OM, CP, EE, CF, NFE and ash percent of citrus pulp were 16.83, 95.19, 11.17, 11.71, 16.58, 55.73 and 4.81%, respectively.

2- The silage quality measurements of different ratios of crop residues and citrus pulp illustrated that the all silages had very good aroma and colour, while the silage of ratio 10:90 was aqueous. The pH values of all silages with different percentages of citrus pulp or different types of crop residues were nearly similar and ranged from 3.15 to 3.80. The
Lactic acid percent ranged from 2.32 to 3.77% in rice straw-citrus pulp silages, ranged from 2.89 to 6.55 % of corn stalks-citrus pulp silages, ranged from 3.12 to 4.11 % of bean straw-citrus pulp silages and ranged from 2.42 to 3.71 % of wheat straw-citrus pulp silages. Free acetic acid ranged from 0.20 to 3.23 mg/100g silage, total acetic acid ranged from 0.5 to 6.44 mg/100g silage and total VFA,s ranged from 1.4 to 6.3 mmol/100ml). The total butyric acid ranged from 0 to 52 mg/100g silage.

3- IVDMD of crop residues and citrus pulp as ratios 10 : 90, 15 : 85, 20 : 80 and 25 : 75 were 48.95, 34.97, 33.91 and 26.32%, respectively, IVOMD were 54.84, 39.03, 34.99 and 27.63, respectively, ISDMD as fresh basis were 69.00, 56.86, 58.21 and 41.02%, respectively, ISOMD as fresh basis were 70.06, 55.36, 56.11 and 42.00%, respectively, ISDMD as air DM basis were 56.58, 51.76, 54.69 and 47.7%, respectively and ISOMD as air DM basis were 60.12, 55.33, 55.33 and 51.00 %, respectively.

4- The chemical composition of silages showed that the DM% of RSS. CSS, BSS and WSS were 28.87, 28.59, 30.43 and 29.91%, respectively, The OM were 83.85, 91.09, 86.99 and 91.80%, respectively, The CP were 8.54, 7.29, 8.99 and 7.32%, respectively, The EE were 3.08, 4.20, 3.25 and 3.85%, respectively, The CF were 30.80, 31.04, 34.05 and 27.78%, respectively, The NFE were 41.43, 48.56, 40.70 and 52.85%, respectively and the ash were 16.15, 8.91, 13.01 and 8.20%, respectively.

5- The DM intake of RSS, CSS, BSS and WSS were 621.07, 654.47, 985.57 and 788.63 g/h/d, 1.17, 1.20, 1.70 and 1.41% LBW and 30.59, 32.52, 46.81 and 38.65 g/kg W0.75. Water consumption were 2366, 1600, 2766 and 1866 ml/h/d and 87.4, 59.1, 97.9 and 67.6 ml/Kg W0.82, respectively. The DM, OM, CP and CF digestibility of RSS were significantly higher than other groups. The NFE digestibility of RSS was significantly higher than groups CSS and WSS and insignificantly higher than BSS. The differences of EE digestibility among all silages were not significant. Digestibility values of DM ranged from 58.34 to 71.38%, OM ranged from 61.74 to 74.96%, CP ranged from 33.91 to 53.93%, EE ranged from 23.60 to 31.97%, CF ranged from 59.05 to 82.86% and NFE ranged from 69.17 to 76.99%. The nutritive value as TDN percent of RSS was significantly higher than BSS and insignificantly higher than CSS and
WSS. The differences among CSS, BSS, and WSS were not significant. The TDN of silages ranged from 56.4 to 63.89%. The DCP percent of RSS was significantly higher than other groups, and DCP of BSS was significantly higher than CSS and WSS and the differences between CSS and WSS were not significant. The DCP of silages ranged from 2.53 to 4.60%. The N-balance of rams fed silages containing crop residues and citrus pulp was negative with all silages and ranged from –2.4 to -3.07 gm/h/d.

6- Feed intake of the rations contained 1.5% from LBW as CFM and silage of citrus pulp and rice straw (R 1), Corn stacks (R 2) Bean straw (R 3) and wheat straw (R 4) showed that the feed intake as g/h/d, % of LBW and g/kg W0.75 of R1 were insignificantly lower than R2 and significantly lower than R3 and R4. The differences among R2, R3 and R4 were not significant. The feed intake ranged from 1138 to 1440 g/h/d, 2.17 to 2.76% of LBW and 58.57 to 75.95 g/kg W0.75. And water consumption ranged from 3166 to 4183 ml/h/d and 121.6 to 161.8 ml/ kg W0.82. The differences of DM, OM and NFE digestibility among all rations were not significant. The CP and CF digestibility of R1 was significantly higher than rations R3 and R4 and insignificantly higher than rations R2, while the differences among R2, R3 and R4 were not significant. The EE digestibility of R1 was significantly lower than R2 and insignificantly lower than R3 and R4. Digestibility values of DM ranged from 61.56 to 65.33 %, OM ranged from 65.57 to 69.97 %, CP ranged from 62.64 to 70.29 %, EE ranged from 43.86 to 55.87 %, CF ranged from 48.57 to 59.06% and NFE ranged from 70.25 to 76.12%. The TDN ranged from 60.39 to 62.84% and DCP ranged from 7.52 to 9.46%. The N- balances of all rations were positive and ranged from 5.52 to 6.18 g/h/d.

7- The digestion coefficients with the differences between CFM + silage and silage alone (indirect method) showed that the digestibility of DM (ranged from 64.55 to 77.00%), OM (ranged from 68.83 to 84.09%), CP (ranged from 35.54 to 57.72%), EE (ranged from 37.25 to 38.32%) and NFE (ranged from 82.13 to 98.98%) were higher while the CF digestibility (ranged from 52.3 to 76.06%) was lower than that of digestibility by direct method, therefore associative effect was positive with all nutrients except CF was negative. The associative effect of digestibility reflected on nutritive values, the TDN was increased with 5.23% (BSS) to
14.50% (CSS) and DCP was increased 2.77% (WSS) to 25.29 (CSS).

8- The rumen parameters of rams fed different silages explained that highest values of ruminal pH were showed before feeding (0hrs) being in range from 7.17 to 7.31 then gradually decreased with advanced time. The pH reached its minimum value at 4 hrs after feeding and ranged from 6.56 to 6.85, then to return to the increasing at 6 hrs after feeding (ranged from 6.65 to 6.85). The differences among all silages at different times were not significant. The maximum values of ruminal NH3-N was showed at 2 hrs after feeding (ranged from 6.76 to 8.28 mg/100ml) then gradually decreased. The minimum values were showed at 0 time before feeding (ranged from 5.17 to 6.64 mg/100ml). The differences of NH3-N in the rumen among all silages at different times were not significant. The total VFA,s in the rumen was increased after feeding and reached its maximum at 2 hrs in RSS and 6 hrs in CSS, BSS and WSS and ranged from 5.83 to 6.61 mEq/100ml. The minimum values of VFA,s was showed at 0 time in all silages (ranged from 4.53 to 5.54 mEq/100ml) except RSS which was at 6hrs (5.53 mEq/100ml) after feeding. However, the average values VFA,s of S2 were significantly higher than RSS and WSS and insignificantly higher than BSS.

9- The rumen parameters of rams fed rations containing 1.5% of LBW as CFM plus silages illustrated that the highest values of ruminal pH were showed before feeding (0hrs) being in range from 6.99 to 7.22 then decreased and reached its minimum value at 2 hrs after feeding and ranged from 6.01 to 6.21, then gradually increasing until 6 hrs after feeding (ranged from 6.21 to 6.37). The ruminal pH of R2 was significantly lower than other rations. The differences among R1, R3 and R4 were not significant. The maximum values of ruminal NH3-N was showed at 2 hrs after feeding (ranged from 15.70 to 18.25 mg/100ml) then gradually decreased until 6 hrs (ranged from 10.14 to 13.30 mg/100ml). The differences of NH3-N in the rumen among all rations at different times were not significant. The total VFA,s in the rumen was increased after feeding and reached its maximum at 2 hrs post feeding (ranged from 7.07 to 8.38 mEq/100ml), then gradually decreased. The minimum values of VFA,s was showed at 0 time in all rations (ranged from 4.37 to 5.83 mEq/100ml). However, the average values VFA,s of R2
were significantly higher than R4 and insignificantly higher than R1 and R3. The differences among R1, R3 and R4 were not significant.