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# **Effect of use of Chalconoids as Antioxidants on Milk Production and on Qualitative and Quantitative Properties of Milk in Zaraibi Goats**

**"Submitted for the degree of Master of Science  
As a partial fulfillment for requirements of the  
master of Science"**

**"Organic Chemistry"**

**Manar Ramadan Abd-Elgaber Soliman**

## **Thesis Advisors**

**Prof. Dr. Hassan M. Fawzy Madkour**

*Professor of Synthetic and Heterocyclic Organic Chemistry,  
Faculty of Science, Ain Shams University*

**Dr. Marwa Sayed Salem**

*Associate Professor of Organic chemistry, Faculty of  
Science, Ain Shams University*

**Prof. Dr. Ferial Abdel Rasoul Hassan**

*Professor of Reproduction Physiology, Animal Production  
Research Institute, Agricultural Research Center*

**Faculty of Science  
Ain Shams University**

**2017**

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**By**

**Manar Ramadan Abd-Elgaber Soliman  
B. Sc. (Major Chemistry)**

**Thesis Advisors**

**Approved**

***Prof. Dr. H. M. F. Madkour*** .....

Professor of Synthetic & Heterocyclic Organic Chemistry,  
Faculty of Science, Ain Shams University

***Dr. M. S. Salem*** .....

Associate professor of organic chemistry, Faculty of  
Science, Ain Shams University

***Prof. Dr. Ferial Hassan*** .....

Professor of Reproduction Physiology, Animal Production  
Research Institute, Agriculture Research Center

**Head of Chemistry Department**

***Prof. Dr. Ibrahim H.A. Badr***

## **Study of Chalcones' Effect on Milk Production in Zaraibi Goats**

Hassan M.F. Madkour<sup>1</sup>, Ferial Hassan<sup>2</sup>, Marwa S. Salem<sup>1</sup>, Manar R. A. Soliman<sup>2</sup>  
<sup>1</sup>Department of Chemistry, Faculty of Science, Ain Shams University, Cairo, Egypt

<sup>2</sup>Animal Production Research Institute, Agriculture Research Center, Dokki, Cairo, Egypt.

### **ABSTRACT**

The present study aimed to evaluate the effect of chalcones on milk production and qualitative properties of milk in Zaraibi goats. Five chalcones have been synthesized *via* Claisen - Schmidt condensation under alkaline conditions. Structures of the synthesized chalcones have been confirmed by their melting point (mp), Infrared spectrum IR and Proton Nuclear Magnetic Resonance (<sup>1</sup>H-NMR) spectra. Total antioxidant capacity (TAC) of the synthesized compounds were measured according to Phosphomolybdenum method, and the results indicated that, chalcone [1-(benzofuran-2-yl)-3-(4-methoxyphenyl)-prop-2-en-1-one] (V) has the highest antioxidant activity among the five synthesized chalcones.

Sixteen dairy Zaraibi goats have been divided into three groups according to their parity, milk yield, body weight and age. G1 (4 animals) served as control group and was fed the basal diet, G2 (6 animals) was fed the basal diet + 250 mg/head/day of chalcone V and G3 (6 animals) was fed the basal diet + 500 mg/head/day of chalcone V for a period of 90 days. Results showed insignificant increase in milk yield of the three groups (1.07, 1.07 and 1.14 L, respectively), in milk protein (2.80, 2.87 and 2.92%, respectively) and milk somatic cells (SCC) (956.4\*10<sup>3</sup>, 981.1\*10<sup>3</sup> and 1181.7\*10<sup>3</sup> cells/ml, respectively). While there were insignificant decrease in milk fat of the three groups (3.70, 3.45 and 3.31%, respectively), milk lactose (4.45, 4.45 and 4.36%, respectively) and total milk solids (11.67, 11.47 and 11.29%, respectively). Total antioxidant capacity of blood serum was insignificantly higher in G2 than G1 and G3 (2.86, 3.25, 2.83 mM/L, respectively). Findings indicate insignificant response of using chalcones on milk production and qualitative properties of milk as it may decomposed in the rumen or not absorbed by the intestine due to its large particles.

**Key words:** Chalcone, Antioxidant, Milk production, milk quality, Zaraibi goats.

## *Acknowledgement*

I would like to thank the **Almighty Allah** for giving me the strength and the ability to work towards the completion of this study.

I would like to express sincere gratitude and appreciation to my study leader **Prof. Dr. Hassan M. Fawzy Madkour**, Professor of Organic chemistry, Faculty of Science, Ain Shams University, for his guidance, effort, assistance and support in my work to complete the study.

I would like to express my deepest appreciation, heartfelt thanks and indebtedness to **Dr. Marwa Sayed Salem**, Associate Professor of Organic chemistry, Faculty of Science, Ain Shams University, for her great efforts, patience, assistance, support and guidance during the study.

I would like to express my sincere gratitude and heartfelt thanks to **Prof. Dr. Ferial Abdel Rasoul Hassan**, Professor of Reproduction physiology, Sheep and Goats Department, Animal Production Research Institute, for her effort, time, helpful advices and valuable opinions.

I would like to express my deep appreciation and indebtedness to **Prof. Dr. Adel Aboul-Naga** for his moral and financial support and **Prof. Dr. Mohammed El-Shafie** for his guidance and endless support while working on the practical part.

Also, thanks are extended to **Prof. Dr. Tarek Ashmawy** who assisted in the field work and sampling, **Dr. Mosad A. Ghareeb** who has helped in measuring the TAC of the synthesized chalcones and my colleagues **Sherif Melak** and **Taha Hosni** who have helped in the statistical analysis.

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## *List of Abbreviations*

<b>Abbreviations</b>	<b>Meaning</b>
<b><sup>1</sup>H-NMR</b>	Proton Nuclure Magnetic Resonance
<b>AAE</b>	Ascorbic Acid Equivelent
<b>AOA</b>	Antioxidant Activity
<b>BHA</b>	Butylated Hydroxy Anisole
<b>CNS</b>	Coagulase Negative Staphylococci
<b>DMI</b>	Dry Matter Intake
<b>DMSO</b>	Dimethyl Sulphoxide
<b>DPPH</b>	Diphenyl Picryl Hydrazile
<b>FCM</b>	Fat Corrected Milk
<b>IC 50%</b>	Inhibition Concentration of 50% of cells
<b>IMI</b>	Intra- Mammary Infection
<b>IR</b>	Infrared
<b>m.p.</b>	Melting Point
<b>MRSA</b>	Methicillin Resistant Staphylococcus Aurers
<b>MTT</b>	Microculture Tetrazolium Test
<b>MW</b>	Microwave
<b>NSS</b>	<i>Nigela Sativa Seeds</i>
<b>PMN</b>	Polymorphonuclear Neutrophiles
<b>PTC</b>	Phase Transfer Catalyst
<b>r.t.</b>	Room Temperture
<b>SAS</b>	Statistical Analysis System
<b>SCC</b>	Somatic Cell Counts
<b>SNF</b>	Solids Non- Fat
<b>SPP</b>	Streptococcus spp
<b>SSA</b>	Silica Sulphoric Acid
<b>TAC</b>	Total Antioxidant Capacity
<b>TLC</b>	Thin Layer Chromatography
<b>TMS</b>	Tetra- Methyl Silaine
<b>TMY</b>	Total Milk Yield
<b>TMY 90</b>	Total Milk Yield during the first 90 days
<b>TS</b>	Total Solids

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# Aim of The Work

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## *Abstract*

The present study aims to evaluate the effect of chalcones on milk production and qualitative properties of milk in Zaraibi goats. Five chalcones have been synthesized *via* Claisen-Schmidt condensation under alkaline conditions. Structures of the synthesized chalcones have been confirmed by their melting point (m.p.), Infrared spectrum IR and Proton Nuclear Magnetic Resonance ( $^1\text{H}$ -NMR) spectra. Total antioxidant capacity (TAC) of the synthesized compounds indicated that chalcone 5 [1-(benzofuran-2-yl)-3-(4-methoxyphenyl)-prop-2-en-1-one] has the highest antioxidant activity among the five synthesized chalcones.

Sixteen dairy Zaraibi goats have been divided into three groups according to their parity, milk yield, body weight and age. G1 (4 animals) serves as control group and was fed the basal diet, G2 (6 animals) was fed the basal diet + 250 mg/head/day of chalcone 5 and G3 (6 animals) was fed the basal diet + 500 mg/head/day of chalcone 5 as oral pills once daily for a period of 90 days. The results showed insignificant increase in G3 than either G1 and G2 in milk yield (1.14, 1.07 and 1.07 Kg, respectively), in milk protein (2.92, 2.80 and 2.87 %, respectively), and in milk somatic

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cells (SCC) ( $1181.7 \times 10^3$ ,  $956.4 \times 10^3$  and  $981.1 \times 10^3$  cells/ml, respectively). While there are insignificant decrease in G3 than either G1 and G2 in milk fat (3.31, 3.70 and 3.45 %, respectively), milk lactose (4.36, 4.45 and 4.45%, respectively) and total milk solids (11.29, 11.67 and 11.47 %, respectively). Total antioxidant capacity of blood serum was insignificantly higher in G2 (3.25 mM/L) than G1 and G3 (2.86 and 2.83 mM/L, respectively). Findings indicate insignificant response of using chalcones on milk production and qualitative properties of milk as it may be decomposed in the rumen or not be absorbed by the intestine due to its large particles.

# SUMMARY

## *Summary*

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### *Summary*

Several reasons prompted us to use chalcones as antioxidant supplements in the dairy goat rations. Firstly, chalcones represent an important group of the polyphenolic family, which includes large number of naturally occurring molecules. In addition, chalcones possess an interesting spectrum of biological activities including antioxidant, antibacterial, anticancer, cytotoxic and immunosuppressive potential. The last and the most important reason is that chalcones can be synthesized *via* simple and efficient methods as Claisen-Schmidt condensation.

Improving the qualitative and quantitative properties of dairy goats' milk has a large number of merits. One of these merits is that milk of dairy goats improves the diet of many rural families. Also, it has a great nutritional value, since it is suitable for children who are allergic to cows' milk, patients with ulcers and sick elderly people.

The present study aimed to evaluate the effect of chalcones on milk production and qualitative and quantitative properties of milk in Zaraibi goats.

Five chalcones have been synthesized via Claisen-Schmidt condensation between acetophenone and benzaldehyde under alkaline conditions. Structures of the

## *Summary*

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synthesized compound have been confirmed on the bases of their melting points, IR and  $^1\text{H}$ -NMR spectrum. Antioxidant activity of the synthesized compounds has been measured according to phosphomolybdenum method. Results indicated that chalcone (1-(benzofuran-2-yl)-3-(4-methoxyphenyl)-prop-2-en-1-one) (**5**) has the highest antioxidant capacity among the synthesized compounds. That is why we used chalcone **5** in our experiment.

Sixteen dairy Zaraibi goats have been chosen out of the flock and divided into three groups according to their milk yield, age, body weight of doe and parity. G1 (4 animals) served as control group and received the control ration (25% concentrate feed mixture and 75 % green berseem). G2 and G3 (6 animals each) served as experimental groups and received control ration besides 250 and 500 mg of chalcone **5**, respectively. Doses have been administrated as oral pills once daily for 90 days.

Milk yield was measured and recorded biweekly. Milk samples have been collected once monthly at the 1<sup>st</sup> day of lactation (zero time, before treatment) and every 30 days till the end of the experiment. Milk samples were analyzed for fat, protein, lactose, total milk solids and solids not fat percentages using Milko-scan (133 BN. FOSS