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**Gastrointestinal microflora homeostasis,
immunity and growth performance of rabbits
supplemented with innovative non-
encapsulated or encapsulated synbiotic**





Authors

Nesrein M. Hashem

Department of Animal Production,
Faculty of Agriculture, Alexandria
University, Alexandria 21545,
Egypt

Nagwa El-Desoky

Department of Animal Production,
Faculty of Agriculture, Alexandria
University, Alexandria 21545,
Egypt

Nourhan S. Hosny

Department of Livestock Research Arid
Lands Cultivation Research Institute.
City of scientific Research and
Technological Application (STR-City),
New Borg El-Arab, Alexandria, Egypt

Mohamed G. Shehata

Department of Food Technology, City of
Scientific Research and Technological
Application (STR-City), New Borg El
Arab, Alexandria, Egypt.,

➤ **Material and Methods:**

The present study was carried out at the Laboratory of Rabbit Physiology Research, Agricultural Experimental Station, Faculty of Agriculture, Alexandria University, Alexandria, Egypt.

A symbiotic consists of *Saccharomyces cerevisiae* yeast, SCY, and *Moringa oleifera* leaf extract, MOLE, encapsulated with alginate was fabricated as a dietary supplement for growing rabbits.



➤ Experimental design:

Sixty-four, 40 days old, growing rabbits were equally allocated into four groups and receiving per each kg diet:

Control: no additives

NCS: non-encapsulated 11×10^{12} SCY + 0.15g MOLE

LCS: encapsulated 5.5×10^{12} SCY + 0.075g MOLE

HCS: encapsulated 11×10^{12} SCY + 0.15g MOLE

➤ Variables:

- 1- Efficiency of formulated synbiotic
- 2- Growth performance of growing rabbits
- 3- Immunological variables

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Table (1): Survivability of non-encapsulated *Saccharomyces cerevisiae* (NSC) cells and novel encapsulated *Saccharomyces cerevisiae* (LCS and HCS).

Number of survival cells (log CFU/ml)	Treatment		
	NCS	LCS	HCS
Oral phase	12.36±0.90 ^a	12.60±0.55 ^a	12.23±0.87 ^a
Gastric phase	6.93±1.11 ^b	8.63±1.02 ^{ab}	10.40±0.95 ^a
Intestinal phase	4.70±0.81 ^b	6.23±1.10 ^b	8.70±0.70 ^a

Table (2): Small intestine microflora composition of rabbit supplemented with non-encapsulated symbiotic (NCS) or two levels of encapsulated symbiotic (LCS and HCS).

Type of microflora	Treatment			
	Control	NCS	LCS	HCS
Coliform	6.30±0.70 ^a	5.40±0.45 ^{ab}	5.13±0.40 ^b	3.20±0.26 ^c
Salmonella	5.96±0.55 ^a	4.90±0.96 ^{ab}	4.00±0.10 ^{cd}	3.46±0.56 ^c
LAB	6.53±0.50 ^c	7.30±0.75 ^b	8.16±0.47 ^{ab}	8.53±0.55 ^a

Means followed by different uppercase letters are significantly different (P < 0.05).

Table(3): Immune and inflammation indicators and of rabbit supplemented with non-encapsulated symbiotic (NCS) or two levels of encapsulated symbiotic (LCS and HCS).

Treatments	Variable		
	IgE	ILs	IGF
Control	7.99±0.78 ^{ab}	18.66±0.13	163.05±3.01 ^{ab}
NCS	7.66±1.71 ^{ab}	19.83±2.33	159.46±2.64 ^{ab}
LCS	5.39±0.65 ^b	15.97±1.24	157.30±5.42 ^c
HCS	8.91±0.65 ^a	19.33±1.61	169.09±2.49 ^a

Table(4): Growth performance of growing rabbits supplemented with non-encapsulated symbiotic (NCS) or two levels of encapsulated symbiotic (LCS and HCS).

Variable	Treatments			
	Control	NCS	HCS	LCS
Initial body weight, g	856.0	848.5	848.5	847.5
Final body weight, g	1761.67 ^b	1835.50 ^{ab}	1923 ^a	1853.89 ^{ab}
Body weight gain, g	914.44	987.50	1074.50	995
Feed consumption, g/week	4881.67 ^{ab}	4840 ^{ab}	4962.50 ^a	4960.56 ^a
Feed conversion ratio	5.47 ^a	4.97 ^{ab}	4.51 ^b	5.08 ^{ab}

Means in the same row with different superscripts significantly differ (P<0.05).

IgG: im-munoglobulin-G, **ILs:** Interleukins , **IGF-1:** Insulin-like growth factor 1.

Conclusion

- The encapsulation process improved the efficiency of innovative symbiotic, improving survival of yeast cells through the digestive tract and allowing more sustained release of moringa leaves ethanolic extract active components.
- Addition of encapsulated symbiotic to the diet of growing rabbits adjusted their gut microflora constitutes and posted immunity and growth performance of rabbits during fattening period.