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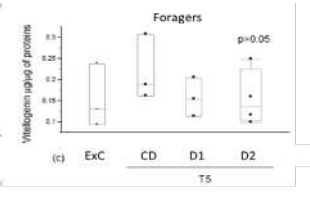
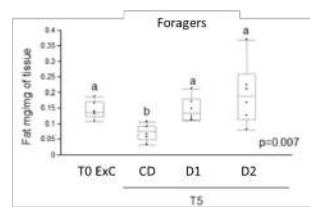


Foragers (FO)

Diet 3
with 1% of coconut-oil



	Parameters analysed	Statistical analysis
Feed Intake	Daily Feed Intake	Kruskal–Wallis H-test, post hoc Mann–Whitney U-test
Survival	Daily survival rate	Wilcoxon rank test -Product Limit Kaplan-Meier
	Social immune system: glucose oxidase activity (GOX)	ANOVA – Tuckey's test
	Individual immune system: phenoloxidase activity (PO)	
Bee health	Antioxidant system Glutathione S-transferase	Kruskal-Wallis H-test Post-hoc: Mann-Whitney U-test
	Fat/Vitellogenin content	



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In conclusion of low percentages of coconut oil in honey bee diets may enhance newly emerged bees' survival and the increase of fat body in summer bees suggesting a potential nutritional role of coconut oil inclusion in preventing lipid deficiency with a potential delay effect on bee aging. Further investigations to assess the suitability of the use of such supplement feed to prevent fat loss and bee aging also in weak families during winter are necessary.

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Honey bee (*Apis mellifera*) nutritional health strongly depends on nectar and pollen, which provide the main source of carbohydrates, proteins and lipids. Administration of supplemented artificial diets is a common beekeeping practice to cope with honey bees nutritional deficiencies and mortality in critical periods. However, the formulation of an integrative diet for honey bee colonies able to prevent nutritional deficiencies is yet to be found. Lipids are the main components of fat body organs functioning as storing energy with great biosynthetic and metabolic activity. Lipids have also a significant role in insect nutrition as structural components in cell membranes, energy sources and reserves, and are involved in many physiological processes. Mechanism regulating fat intake in bees is yet unknown. However, lipid restriction has been proved to affect the social organisation, health, hive duties and productivity of the whole colony. In this study the effects of 0.5% and 1% fat-enriched diet administration on summer newly emerged and forager bees' survival rate, feed intake and health (i.e., immune and antioxidant system, fat and vitellogenin content) was investigated. Diet supplementation with both 0.5% and 1% coconut oil determined an increase in newly emerged bees survival rate from the 3rd to 14th day of feeding compared to control. Moreover, an overall increase in fat content over longer times (i.e., 20th day of rearing) was recorded. In newly emerged bees fed 1% enriched diet a decrease in feed consumption and phenoloxidase activity was recorded, while no differences in vitellogenin content occurred. Also in foragers bees fed both 0.5% and 1% coconut oil-enriched diet an increase in fat content was recorded. Therefore, inclusion of low percentages of coconut oil in honey bee diets may enhance newly emerged bees' survival and lipid content in summer bees. This suggests a potential nutritional role of coconut oil inclusion in preventing lipid deficiency in bees. Further investigations to assess the suitability of the use of such supplement feed to prevent fat loss also in weak families during winter are necessary.