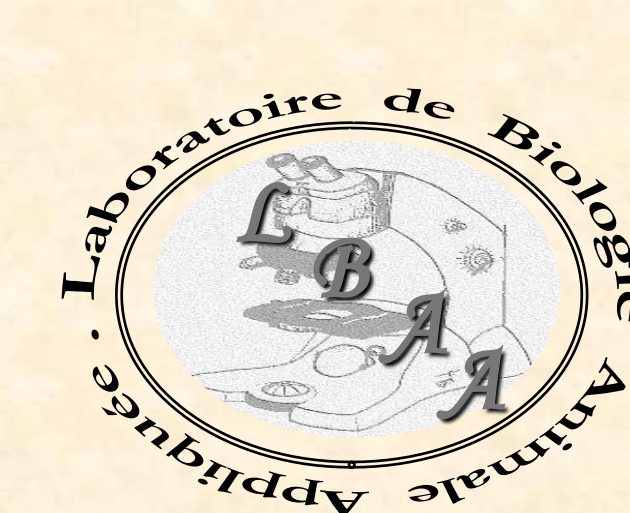




Impact of some acaricides used against *Varroa destructor* (Mesostigmata: Varroidae) on the physiology of *Apis mellifera intermissa* (Hymenoptera: Apidae)

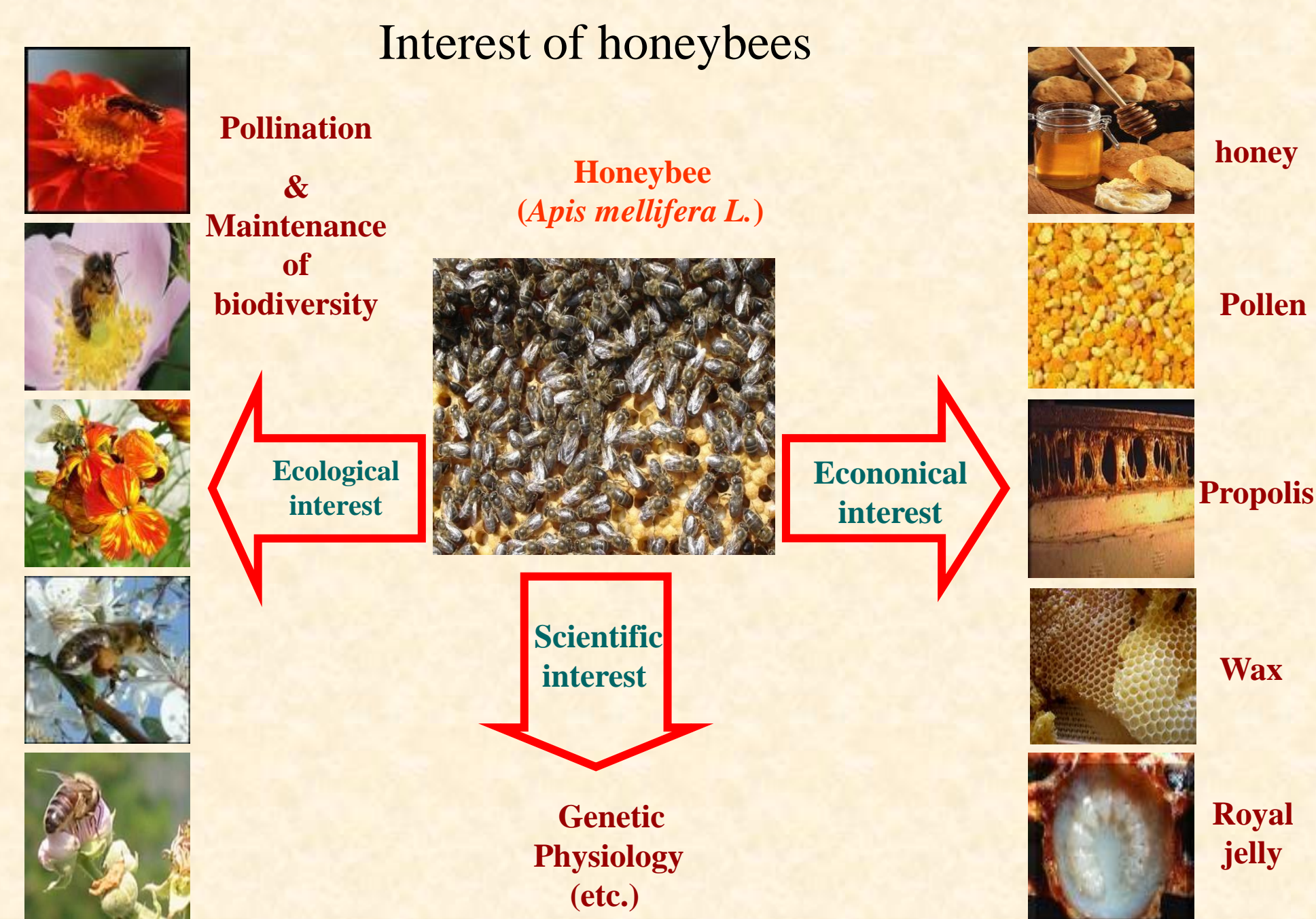


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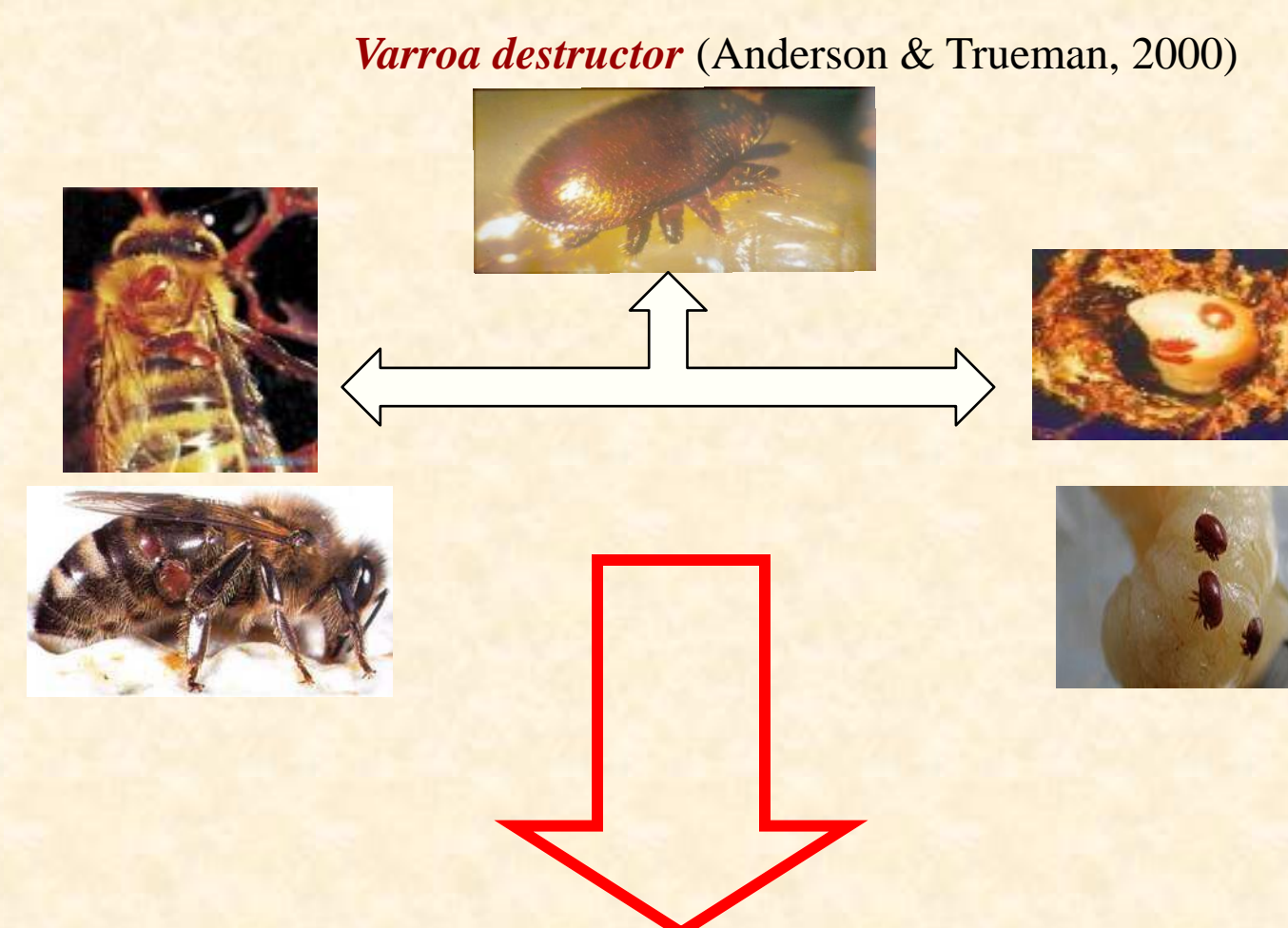
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The parasitic mite *Varroa destructor* (Acari, Varroidae) is a pest of the honeybee *Apis mellifera* (Hymenoptera, Apidae).



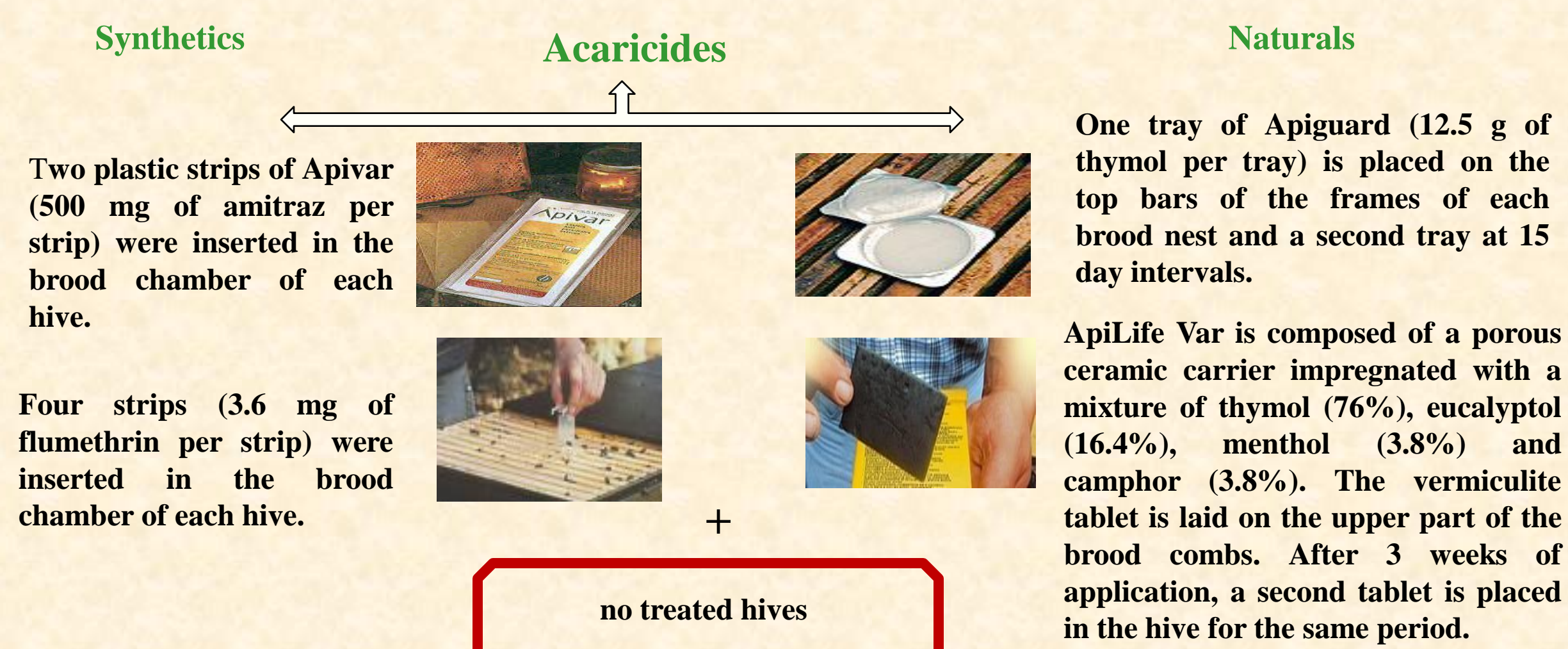
The control of this mite infestation is obtained by the use of several acaricides..

AIMS

The objective of this study is to determine eventual secondary effects of four acaricides treatments, namely the synthetic compounds Bayvarol and Apivar and the two natural ones, Apiguard and ApiLife Var, on the metabolism of the bees by measuring the amounts of protein, carbohydrates and lipids in the hemolymph and body tissues of new emerging worker bees, nurses and forager bees as biological endpoint of secondary acaricide effects.

MATERIALS AND METHODS

- ▶ The experiments were carried out in an apiary of honeybees derived from *Apis mellifera intermissa*.
- ▶ Five groups (acaricide treatments and control) of five hives each were used.



❖ Then amounts of protein, carbohydrate and lipid in whole bodies and hemolymph of honeybee adults were determined after extraction (Shibko *et al.*, 1966) by spectrophotometric methods of Bradford (1976), Duchateau and Florking (1959) and Goldsworthy *et al.* (1972), respectively.

❖ After 21 days of brood stages (eggs, larvae and pupae), adult worker bees were sampled in each group at 0, 7 and 21 days during the adult life and the samples were analysed individually.

❖ ANOVA followed by a *post-hoc* Tukey test.

❖ Levene method .

RESULTATS

Bayvarol and Apivar caused a considerable decrease of the main biochemical compounds of the hemolymph in the adult worker from emergence to foraging, and to a lower extent also in the proteins and lipids in the body tissues of 0- and 7-d-old workers.

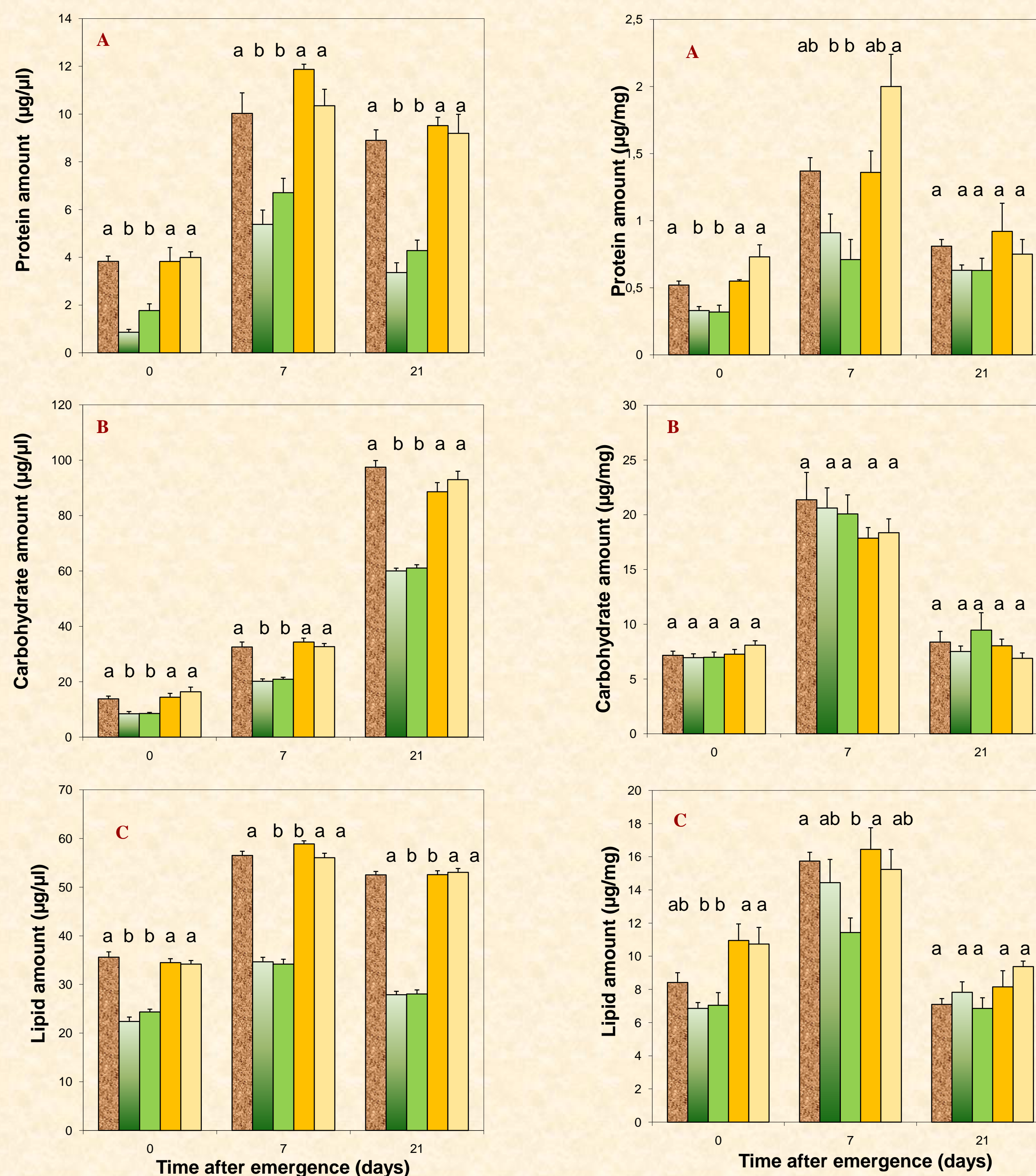


Figure 1. Effects of acaricides on the protein (A), carbohydrate (B) and lipid (C) concentration (µg/µl) in the hemolymph during the adult development of worker honeybees *Apis mellifera intermissa*. Data are expressed as means ± SE (n=12-18). Within each date, different letters above bars indicate significant differences at p < 0.05 (ANOVA followed by a *post-hoc* Tukey test).

Figure 2. Effects of acaricides on the protein (A), carbohydrate (B) and lipid (C) contents (µg/mg) in the body extract during the adult development of worker honeybees *Apis mellifera intermissa*. Data are expressed as means ± SE (n=12-18). Within each date, different letters above bars indicate significant differences at p < 0.05 (ANOVA followed by a *post-hoc* Tukey test).

CONCLUSION

The two thymol formulations ApiLife Var and Apiguard impaired less the amounts of protein, carbohydrates and lipids of the honeybees than Apivar and Bayvarol. Further experiments should be conducted to establish the relationship between reduction in the biochemical components detected in the adult workers and acaricides.