



# EXPRESSION OF AMYLASES IN ADULT HONEY BEES FED WITH DIFFERENT PATTIES



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## Abstract

Influence of commercial patty and the same patty enriched with 12.5% pollen on amylase expression in honey bee (*Apis mellifera*) adults is presented. This is part of a larger study aimed to compare the activity of digestive enzymes when using different patties. We assume that data collected in this way can be used for development of better food supplements for honey bees.

## Introduction

Honey bees were kept in an incubator for 21 days, at a temperature of 35°C and at 80% humidity. In each cage there were one hundred bees and a piece of honeycomb. Midgut and hindgut samples (Fig.4) were taken after 7, 14 and 21 days and midgut without hindgut was taken after 21 days. Samples were homogenised and used for amylase zymogram, IEF and enzyme assays.

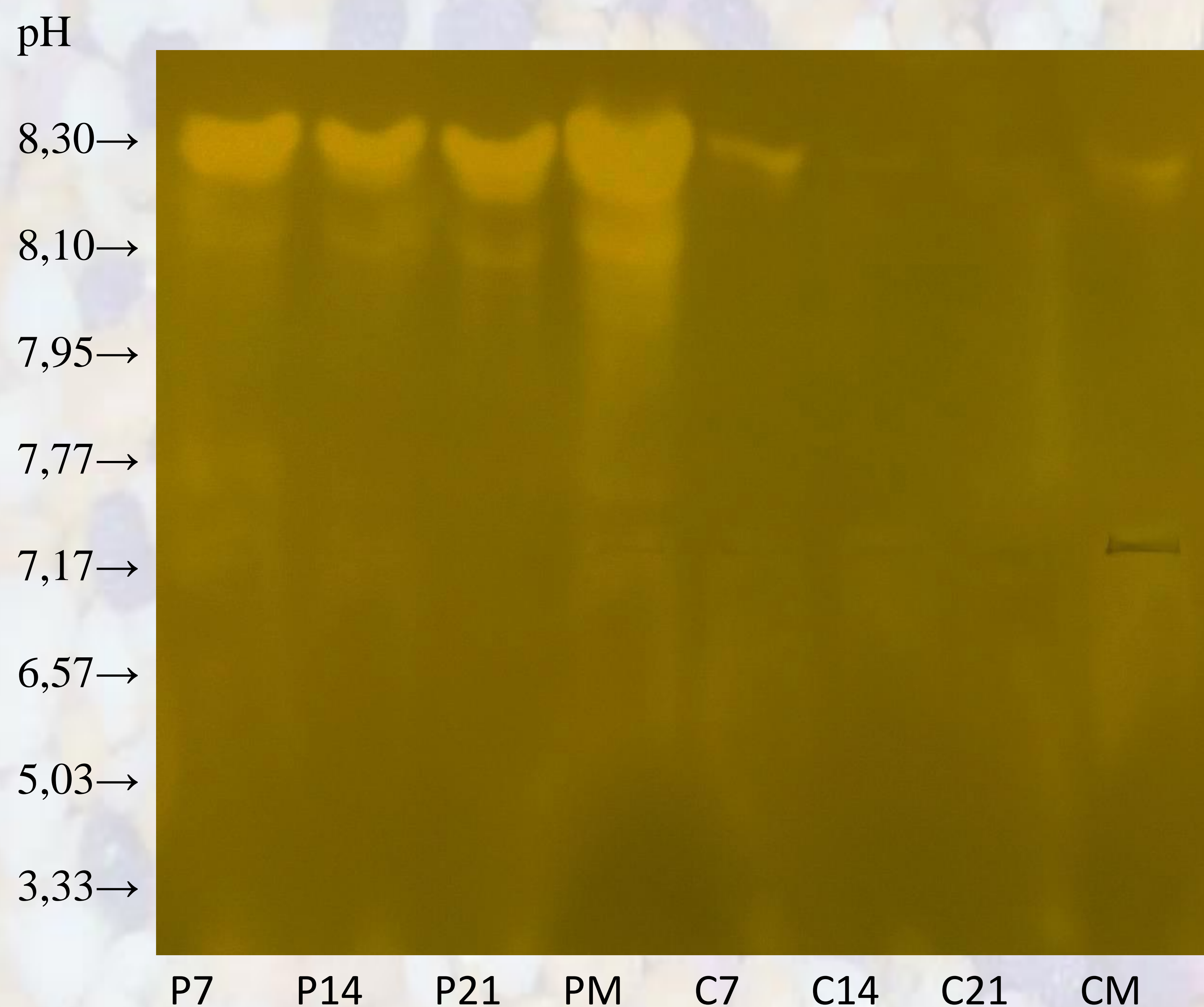


Fig 1. Zymogram detection of amylase after IEF after 7, 14 and 21 days. M-midgut without hindgut; P-pollen patties; C – commercial patties;

## Results

There was no mortality during the experiment. In contrast to bees fed commercial patty, bees fed on pollen patty had built a new honeycomb. The high protein concentration was detected in the midgut in both groups of bees. Amylase activity was significantly higher in bees fed pollen patties, which is shown by enzyme assay (Fig.3) and by zymograms (Fig.1 and Fig.2). There are different amylase isoforms present in bees fed pollen in comparison to bees fed commercial patties.

## Acknowledgments

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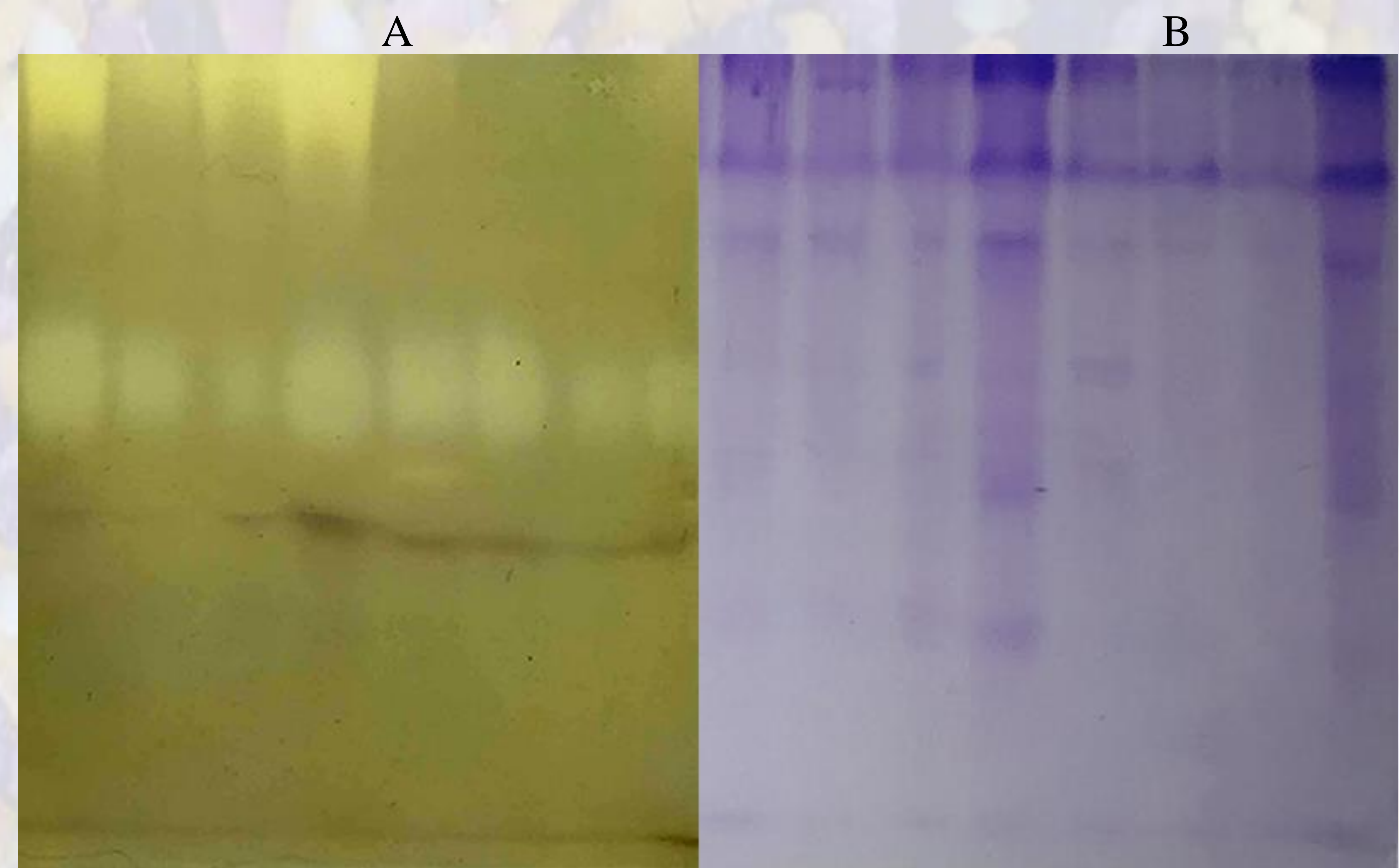


Fig 2. Zymogram detection of amylase (A) after native PAGE and native Page dyed with CBB (B) after 7, 14 and 21 days. M-midgut without hindgut; P-pollen patties; C – commercial patties;

## Discussion

Decrease in amylase activity over time is probably due to dilution caused by accumulation of water and undigested substances in the hindgut. Reduced amylase activity in the intestines of bees fed commercial patties is due to a lack of starch or inducers present in pollen. We assume that food supplements that induce similar enzyme expression as pollen can be superior in comparison to supplements that induce very different enzyme expression.

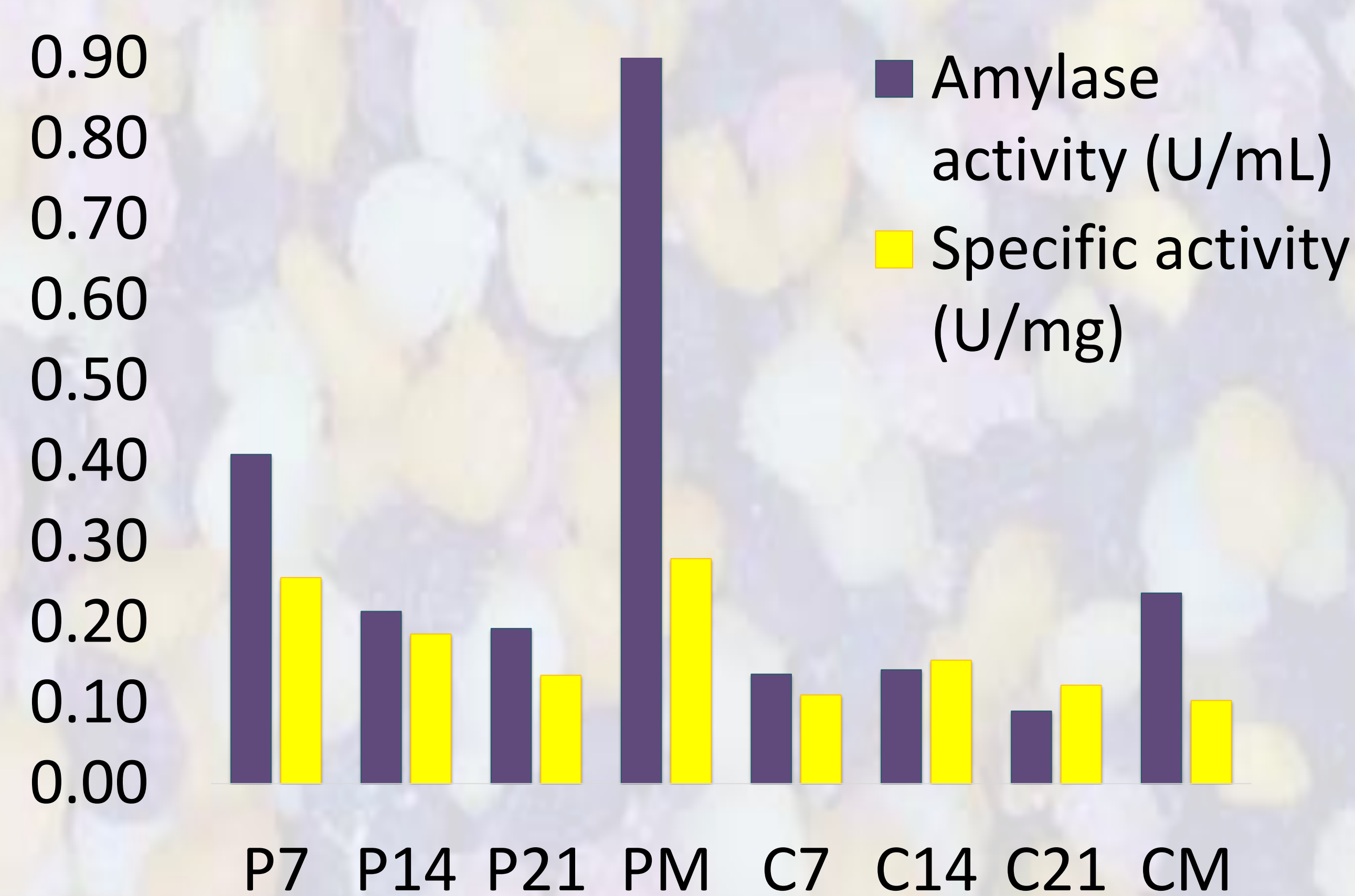


Fig 3. Histogram of amylase activity in honey bee midgut and hindgut after 7, 14 and 21 days. M-midgut without hindgut; P-pollen patties; C – commercial patties;

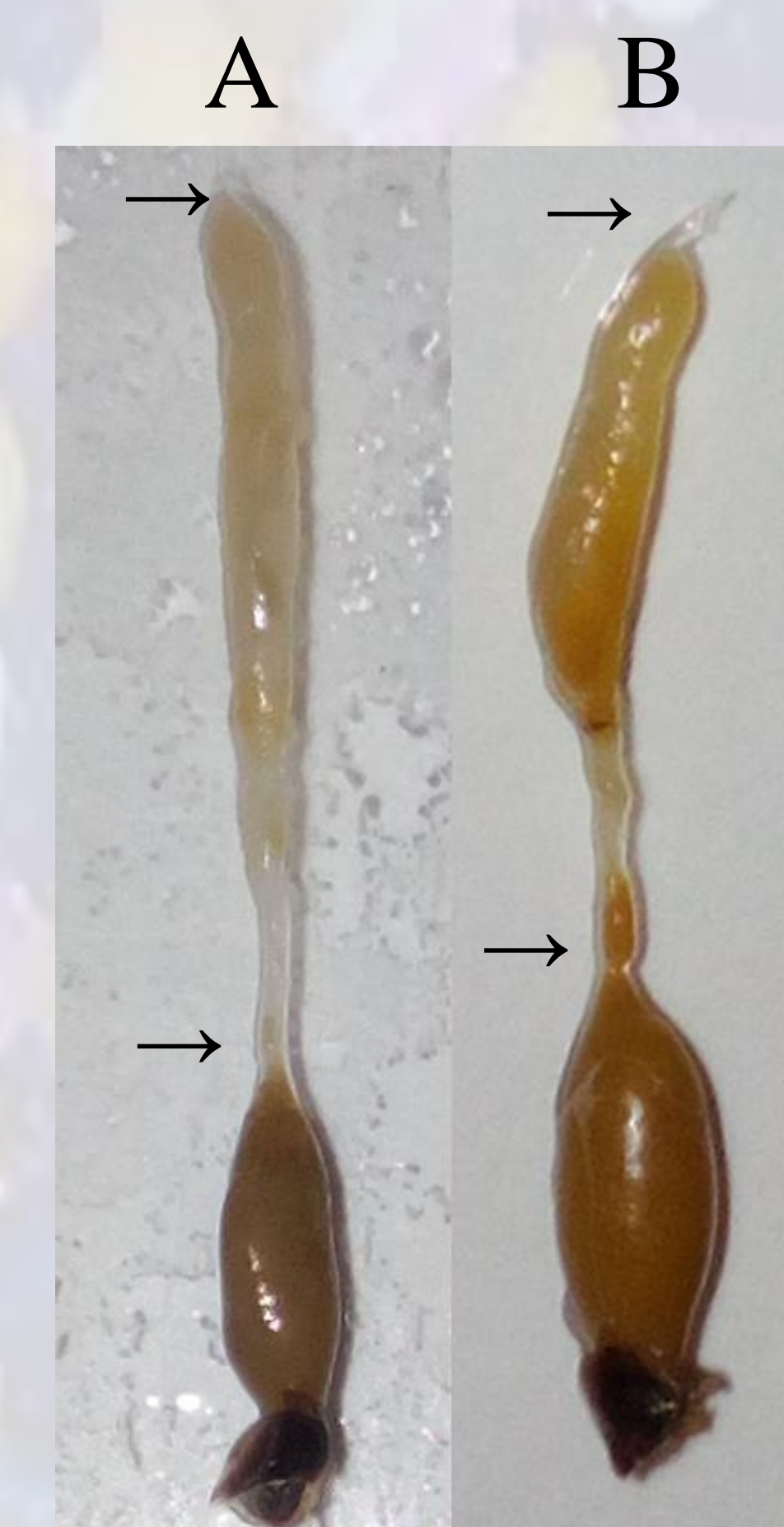


Fig 4. *A. mellifera* adult midgut and hindgut fed with commercial (A) or pollen (B) patty; gut cutting sites are marked by arrows.

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