



Solvent polarity fractionation for extracting mulberry leaf powder as silkworm attractant

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Introduction

Among various environmental cues, chemical information is the most important factor for insect survival and reproduction. Insects usually rely on pheromone signals in homogenous communication, the main signals are sexual, gathering and feeding signals. However, there are few studies on the application of plant-derived feeding pheromones in artificial feed promotion. The development of new insect feeding attractors can not only attract insects but also provide the effect of promoting feed intake, which is the need of green and sustainable development.

Methods

In this study, organic reagents of different polarities were used to extract mulberry leaves in different stages, and behavioral experiment were carried out on silkworms to obtain graded components with different attractant effects on silkworms. A better attractant component was selected through comparative analysis between extracts of different polarities. Among them, the separation method of different polarity is according to the difference of polarity and solubility, petroleum ether, ethyl acetate, chloroform and methanol were used to extract the fat-soluble components from mulberry leaves.

Results & Discussion

Table 1. Extraction efficiency and post-extraction residue of mulberry leaf powder

Extractive	Petroleum ether extraction	Ethyl acetate extraction	Acetone extraction	Methanol extraction
Extraction efficiency (%)	7.55±0.2	3.82±0.35	2.53±0.5	14.84±1.2
Post-extraction residue (g)	92.54±0.2	89.7±0.32	86.75±0.45	73.87±1.04

As shown in Table 1, four kinds of extracts were obtained by fractional extraction: petroleum ether extract, ethyl acetate extract, acetone extract and methanol extract. The extraction rate of methanol extract was 14.84%, and the extraction rate of petroleum ether extract was 7.55%. Although the extraction rate of methanol is higher, the solid solution content of petroleum ether is higher.

Acknowledgement

This work was supported by the Jiangsu Agricultural Science and Technology Innovation Fund (CX (20) 2029).

References

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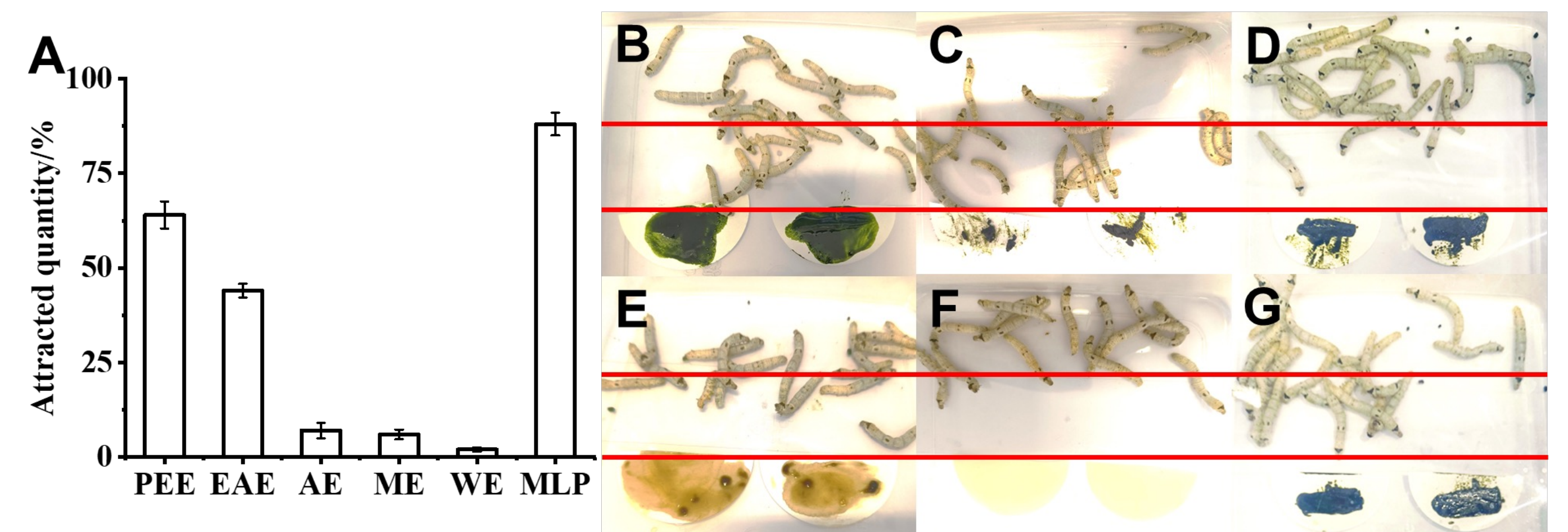


Figure 1. Attractant effect of different extract components on *Bombyx mori* (A) PEE: petroleum ether extract (B), EAE: ethyl acetate extract (C), AE: acetone extract (D), ME: methanol extract (E), WE: water extract (F), MLP: mulberry leaf powder (G)

Figure 1 shows the attractive effects of different extracts extracted by different polarities on silkworms, among which petroleum ether extract has the strongest attraction and attracts the largest number of silkworms, followed by ethyl acetate extract, while acetone and methanol extract have only weak attraction. The water extract was not attractive at all, while the mulberry leaf group as a control was the most attractive. Petroleum ether can usually extract oil, chlorophyll, volatile oil and other substances in plants.

Conclusion

This study established a new classification method for silkworm feeding attractants, and obtained the components with good feeding effect. The components were subsequently detected by GC-MS to obtain specific compounds, and the verification of the compounds needed to be further studied, providing a new classification method for component extraction and a new idea for the development of novel silkworm feeding attractants.