



Analysis of Capsaicin and Dihydrocapsaicin in Capsicum

Introduction

The pungent components (which are responsible for the 'hotness') contained in the fruit of the genus *Capsicum* are collectively referred to as the Capsaicinoids. Capsaicin and dihydrocapsaicin in *Capsicum*s constitute 80 - 90% of the pungent components; these compounds are now widely used in medical products and health foods.

It is known that the capsaicinoids are present in differing amounts in the various parts of the *Capsicum* fruit. In this experiment the Capsaicinoid content of the pericarp, seed and placenta from each of four types of capsicum was measured - *Capsicum frutescens*, Serrano, Finger hot and Habanero.



JASCO LC-2000PLUS HPLC System
View product information at www.jascoinc.com

Experimental

Equipment

| Equipment | |
|--------------|---------|
| Pump: | PU-2089 |
| Column Oven: | CO-2060 |
| Autosampler: | AS-2057 |
| Detector: | MD-2018 |

Conditions

| | |
|-------------------|---|
| Column: | CrestPak C18S (4.6 mmID x 150 mmL, 5 mm) |
| Eluent A: | 1% Acetic acid/Acetonitrile (50/50) |
| Eluent B: | Acetonitrile |
| Gradient | (A/B), 0 min (100/0) → 15 min (100/0) |
| Condition: | → 15.05 min (0/100) → 20.00 min (0/100) → 20.05 min (100/0) 1 cycle; 35.5 min |
| Flow rate: | 1.0 mL/min |
| Standard sample: | Powdered Coptis japonica (0.5 g/50 mL in methanol / 10% hydrochloric acid (100/1)) |
| Column temp.: | 40°C |
| Wavelength: | 280 nm |
| Injection volume: | 20 µL |
| Standard sample: | Capsaicin 10, 50, 100 mg/mL in Methanol Dihydrocapsaicin 10, 50, 100 µg/mL in Methanol |

Result

The chromatograms of the 10 µg/mL each of Capsaicin and Dihydrocapsaicin standard sample are shown in Fig. 1. Good separation was obtained within 12 minutes. The sampling procedure of the actual samples is shown in Fig. 2.

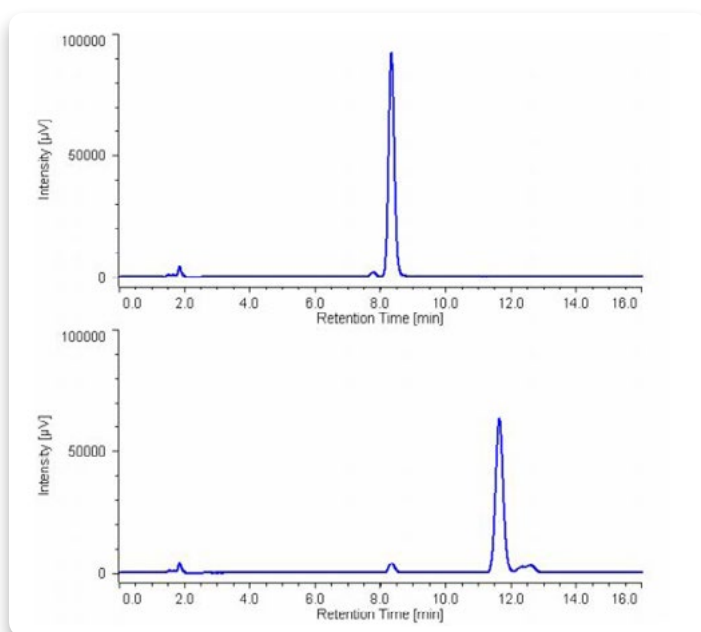


Fig. 1 Chromatogram of Capsaicin and Dihydrocapsaicin standard

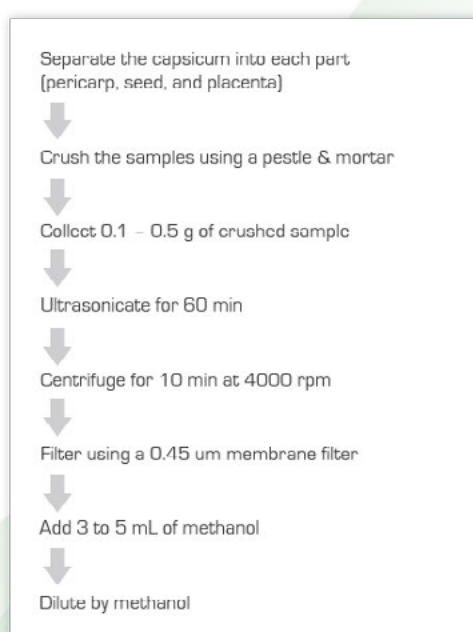


Fig. 2 Sample Preparation

The chromatograms for each 4 kinds of Capsicum are shown in Fig. 3. In Table 1 the Capsaicin and Dihydrocapsaicin content in the each Capsicum sample (wet weight) are shown. It is known that the contents are very different depending on each part and for the all capsicum, Placenta part contains Capsaicin and Dihydrocapsaicin the most.

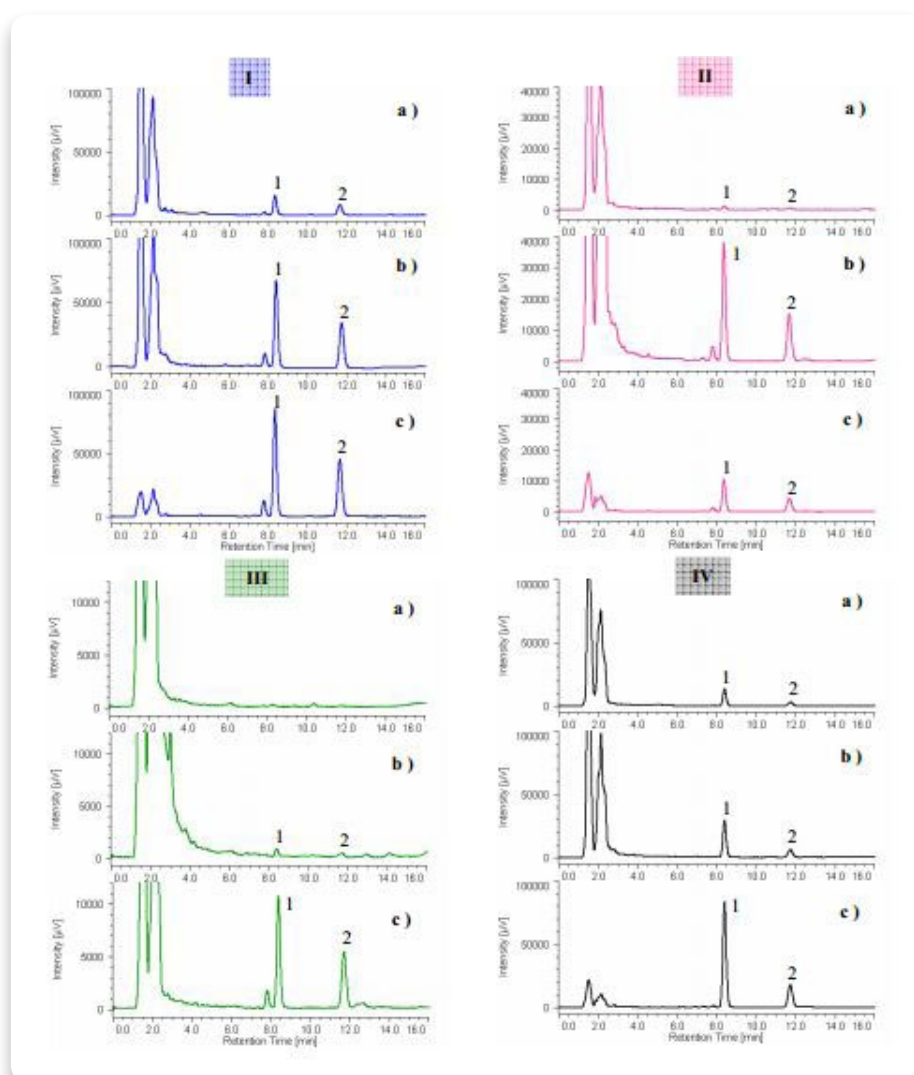


Fig. 3 Chromatograms for each of the four species of Capsicum measured. Table 1 shows the Capsaicin and Dihydrocapsaicin content for each Capsicum sample (wet weight). It is well known that the amount of capsaicinoids present is very different depending on the part of the capsicum fruit and is widely different between species; the placenta contains the majority of capsaicin and dihydrocapsaicin, followed by the seed and then the pericarp which may contain little or no capsaicinoids.

Table 1 Capsaicin and Dihydrocapsaicin content in each part of the Capsicum

| Sample | Contents in each sample [µg/g] | |
|----------------------------|--------------------------------|------------------|
| | Capsaicin | Dihydrocapsaicin |
| Capsicum frutescens | | |
| Pericarp | 154 | 120 |
| Seed | 713 | 542 |
| Placenta | 9540 | 7410 |
| Serrano | | |
| Pericarp | 7.64 | 4.47 |
| Seed | 387 | 229 |
| Placenta | 1080 | 644 |
| Finger Hot | | |
| Pericarp | N.D. | N.D. |
| Seed | 2.89 | 2.87 |
| Placenta | 217 | 160 |
| Habañero | | |
| Pericarp | 134 | 43.2 |
| Seed | 297 | 92.5 |
| Placenta | 8720 | 2750 |
| <i>N.D.: Not Detected</i> | | |