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ลิขสิทธิ์ของบัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

ISOLATION OF PHTHALATE ESTERS IN CERTAIN DAIRY
PRODUCTS USING SOLID PHASE SORBENT MEMBRANE

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A Thesis Submitted in Partial Fulfillment of the Requirements
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พิมพ์ต้นฉบับบทคัดย่อวิทยานิพนธ์ภายในกรอบสี่เหลี่ยมนี้เพียงแผ่นเดียว

กาญจนาวดี อำไพศรี : การแยกพทาเลทเอสเทอร์ในผลิตภัณฑ์นมบางชนิดโดยใช้เยื่อตัวดูดชนิดตัวภูมิภาคแข็ง (ISOLATION OF PHTHALATE ESTERS IN CERTAIN DAIRY PRODUCTS USING SOLID PHASE SORBENT MEMBRANE) อาจารย์ที่ปรึกษา :
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ในการศึกษานี้ได้ทำการพัฒนาวิธีวิเคราะห์สารไดเมทิลพทาเลท ไดเอทิลพทาเลท ไดนอร์มัลบิวทิลพทาเลท บิวทิลเบนซิลพทาเลท ไดบูเททิลเฮกซิลพทาเลท และ ไดนอร์มัลออกทิลพทาเลทในตัวอย่างผลิตภัณฑ์นม โดยใช้วิธีการศึกษา 8 วิธี คือการใช้กับเยื่อตัวดูดชนิดตัวภูมิภาคแข็งโดยตรง เจือจางตัวอย่างก่อนผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็ง ใช้เยื่อตัวดูดชนิดตัวภูมิภาคแข็งกับตัวช่วยกรอง เจือจางตัวอย่างก่อนที่จะผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็งและตัวช่วยกรอง สกัดตัวอย่างด้วยตัวทำละลายก่อนผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็ง ปรับความเป็นกรด-เบสที่ค่าความเป็นกรด-ด่างเท่ากับ 2.10 ก่อนผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็ง ผ่านการหมุนเหวี่ยงก่อนผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็ง และ ตกตะกอนตัวอย่างที่ความเป็นกรด-ด่างเท่ากับ 4.2 ก่อนผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็ง ผลการศึกษาพบว่าวิธีปรับค่าความเป็นกรด-ด่างเท่ากับ 2.10 ก่อนผ่านเยื่อตัวดูดชนิดตัวภูมิภาคแข็งจะให้ผลดีที่สุด โดยให้ค่าประสิทธิภาพการสกัดอยู่ในช่วงร้อยละ 78.74-129.65 สำหรับการตรวจวัดด้วยเครื่องแก๊สโครมาโทกราฟี-เฟลมไอออไนเซชัน ดีเทคเตอร์ และ 63.95-117.95 สำหรับการตรวจวัดด้วยเครื่องแก๊สโครมาโทกราฟี-อิเล็กตรอนแคปเจอร์ ดีเทคเตอร์ ร้อยละของค่าความเบี่ยงเบนมาตรฐานสัมพัทธ์ อยู่ในช่วง 1.34-5.63 สำหรับการตรวจวัดด้วยเครื่องแก๊สโครมาโทกราฟี-เฟลมไอออไนเซชัน ดีเทคเตอร์ และ 1.18-12.08 สำหรับการตรวจวัดด้วยเครื่องแก๊สโครมาโทกราฟี-อิเล็กตรอนแคปเจอร์ ดีเทคเตอร์ จดจำกัลดต่ำสุดของวิธีการตรวจวัดสารเหล่านี้อยู่ที่ระดับ 5.25-17.76 ส่วนในพันล้านส่วน สำหรับการตรวจวัดด้วยเครื่องแก๊สโครมาโทกราฟี-เฟลมไอออไนเซชัน ดีเทคเตอร์ และ 1.31-17.76 ส่วนในพันล้านส่วน สำหรับการตรวจวัดด้วยเครื่องแก๊สโครมาโทกราฟี-อิเล็กตรอนแคปเจอร์ ดีเทคเตอร์ นอกจากนี้ยังได้นำวิธีการเตรียมตัวอย่างที่ใช้ได้ผลดีที่สุด ไปทดลองศึกษาสารตัวอย่างนม 6 ชนิด พบว่า ตรวจพบไดบูเททิลเฮกซิลพทาเลท ปริมาณน้อยในทุกตัวอย่าง ในช่วงระดับความเข้มข้น 10-30 ไมโครกรัมต่อกิโลกรัม

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ลายมือชื่อนิสิตกาญจนาวดีอำไพศรี.....
ลายมือชื่ออาจารย์ที่ปรึกษาวราภรณ์ ลิพิพัฒน์ไพบูลย์.....
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USING SOLID PHASE SORBENT MEMBRANE. THESIS

ADVISOR : VARAPORN LEEPIPATPIBOON, Dr.rer.nat.

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This study makes an attempt to develop an analytical method to determine dimethyl phthalate, diethyl phthalate, dibutyl phthalate, butylbenzyl phthalate, di(2-ethylhexyl)phthalate and di-n-octyl phthalate in milk samples. Eight methods were utilized: namely direct application of solid phase sorbent membrane, dilution of the sample before passing through solid phase sorbent membrane, using the filter aid together with the solid phase sorbent membrane, dilution of the sample prior to the filter aid and solid phase sorbent membrane, extraction sample with solvent before passing through solid phase sorbent membrane, pH adjustment to 2.10 before passing through the solid phase sorbent membrane, centrifugation before passing through the solid phase sorbent membrane, precipitation the sample at pH 4.2 before using solid phase sorbent membrane. The results of the study revealed that the pH adjustment to 2.10 before passing through the solid phase sorbent membrane was the optimum method with percent recoveries ranging from 78.74-129.65 for GC-FID, and 63.95-117.95 for GC-ECD. Percent relative standard deviation (RSD) for GC-FID is in the range of 1.34-5.63, and for GC-ECD 1.18-12.08. The method detection limit (MDL) for GC-FID ranges from 5.25-17.76 $\mu\text{g}/\text{kg}$, and 1.31-17.76 $\mu\text{g}/\text{kg}$ for GC-ECD. Best method proposed in this study was applied to the study of six milk samples. Trace amounts of DEHP was found in every sample. In a range of 10 - 30 $\mu\text{g}/\text{kg}$.

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