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研究生(中)	張慧菁
研究生(英)	Chang hui chin
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指導教授(中)	林瑜雯
指導教授(英)	
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關鍵字(中)	染髮劑，胺基苯酚，苯二胺，滲透，防護手套
關鍵字(英)	hair dye, aminophenol, phenylenediamine, permeation, protective glove
摘要(中)	胺基苯酚（aminophenol）、苯二胺（phenylenediamine）及其同分?構物（isomers）為染髮劑中的顯色成分，亦是造成接觸性皮膚炎之主要危害物質。以 ASTM F739 之標準滲透測試方法測試市售 2 種染髮劑（B 染髮劑-自然黑色與 F 染髮劑-紅銅棕色）中之對苯二胺及胺基苯酚之鄰、間、對?構物挑戰 3 種手套(A 手套-染劑附贈手套、B 手套-拋棄式乳膠[latex]手套及 C 手套-丁?橡膠[nitrile]手套)之滲透性。利用滲透測試結果，評估染髮時所使用之防護手套能否有效隔?染髮劑中之胺基苯酚、苯二胺及其同分?構物，以?低可能的皮膚??。 滲透結果顯示，B 染髮劑挑戰 A 手套之最短破出時間（breakthrough time, tb）與延滯時間(lag time, tl)為鄰胺基苯酚，分別為 70~80 分鐘與 73~83 分鐘，B 染髮劑挑戰 B 手套最短破出時間與延滯時間為對苯二胺，分別為 250~300 分鐘與 250~301 分鐘；F 染髮劑挑戰 A 手套最短破出時間與延滯時間為對胺基苯酚，皆為 200~280 分鐘。而 C 手套則無任何可偵測之滲透發生。如以破出時間為防護效率之考量，則 A 手套應可提供 1 小時的保護，B 手套為 3 小時，C 手套可重複使用 6 天，每天使用 6 小時。因此建議美髮業者在進?長時間的染髮作業時，可穿戴丁?橡膠材質之手套以減低可能的皮膚??。 B 染髮劑挑戰 A 手套之結果以鄰胺基苯酚之穩定滲透速率與擴散係數最大，分別為 5.26±0.42 μg/min-cm2 與 0.23±0.02 10-4mm2/min。B 染髮劑對 B 手套最大之穩定滲透速率與擴散係數亦為鄰胺基苯酚，分別為 1.72±0.00 μg/min-cm2 與 0.17±0.00 10-4mm2/min。F 染髮劑挑戰 A 手套最大之穩定滲透速率與擴散係數則為對胺基苯酚，分別為 1.02±0.18 μg/min-cm2 與 0.12±0.05 10-4mm2/min。 迴歸分析結果顯示，B 染髮劑挑戰 A 手套之破出時間、延滯時間分別皆與擴散係數及 logkow 呈現負相關(p
摘要(英)	Aminophenol, phenylenediamine, and their isomers are the color-changed ingredients of hair dyes. Nevertheless they are the main hazardous chemicals causing contact dermatitis. The ASTM F739 standard permeation test method was applied to investigate the permeation of the para- meta-, and ortho- isomers of aminophenol and p-phenylenedimine in two different commercially available hair dyes(code B- natural black and code F-mahogany copper brown). Three different glove materials were tested (Glove A - gloves included in the hair-dye packages, Glove B - latex gloves,

	and Glove C - nitrile gloves). The permeation results of these chemicals were utilized to evaluate the protective efficiencies of the 3 tested gloves. The appropriate gloves were recommended to prevent the dermal exposure of hair dyes. The o-aminophenol in code B hair dye resulted in the shortest breakthrough time (tb = 70 ~ 80 min) and lag time (tl = 73 ~ 83 min) while challenged with glove A. With glove B, the earliest breakthrough of code B hair dye was p-phenylenediamine with tb = 250 ~300 min and tl = 250 ~301 min. The other hair dye - code F challenged with Glove A showed o-aminophenol permeated first with the breakthrough time (tb = 200 ~ 280 min) and lag time (tl = 200 ~ 280 min). No breakthrough was detected for Glove C. According to the results of the breakthrough times and lag times, these three gloves provide different protection durations – 1 hour for Glove A, 3 hours for Glove B, and 6 days for Glove C with daily use of 6 hours. Therefore, nitrile gloves (Glove C) are recommended for long-time handling of these hair dyes to prevent dermal exposure. The o-aminophenol was the one with the fastest steady state permeation (SSPR) and the largest diffusion coefficient (D) among all tested conditions in this study. The fastest SSPR was 5.26?0.42 μg/min-cm2and the highest D was 0.23?0.02 10-4mm2/min for code B hair dye with Glove A. This suggested that the exposure dose of o-aminophenol might also be higher than other tested chemicals once the permeation initiated. The regression analyses showed that breakthrough time (tb) was inversely correlated with diffusion coefficient (D) or the logKow for code B hair dye with Glove A significantly (p
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