

EVALUATION OF COLOURLESS CLEAR FINGERNAIL POLISH MATERIAL AS A PERMANENT MOUNTING MEDIUM⁺

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Abstract

Within 7 years, 88 slides have been followed up and studied by macroscopic and microscopic examinations to evaluate the material of colourless clear finger nail polish (local and foreign brands), as a permanent mounting medium for microscopic slides. These slides were divided into 4 equal groups and these groups were different from each other in the types of their stained smears which were fixed on these slides, the slides of each group were unified with the type of stained smears. All smears were mounted with the material under study, 10 slides for each brands, and 2 control slides mounted with Canada balsam.. The results of this study revealed that 100% was the incidence of slides which showed the following characteristics: Stable colouration of cells and other structures in the stained smears, the mounting medium remains colourless, no morphological changes in the cells and other structures, and no preceipitates. While 90.5% was the incidence of slides which show stability against air bubbles formation. The material of both brands show similar results. In conclusion, material of colourless clear fingernail polish (local and foreign brands) ,is recommended for use as permanent mounting medium for microscopic slides.

key words : Fingernail polish , permanent mounting medium .

المستخلص

على مدى سبع سنوات خضعت ٨٨ شريحة مجهرية للمتابعة وذلك من خلال إجراء الفحوصات المجهرية و العيانية بشكل دوري لتقييم مادة طلاء الاظافر الشفافة و عديمة اللون من الانتاج المحلى و الاجنبى. قُسمت الشرائح المذكورة أعلاه الى أربع مجاميع متساوية عددياً وأختلفت فيما بينها بنوع المسحة المثبتة عليها ونوع الملون المستخدم لكل مسحة ، كما تفردت كل مجموعة بنوع واحد من المسحة و الملون. فى كل مجموعة أستخدم الانتاج المحلى و الاجنبى من مادة الطلاء كوسط لصق دائمى للشرائح المذكورة، خصصت عشر شرائح لكل منتج، وخصصت شريحتان للتحكم أستخدمت لهما مادة الكندا بلسم. و كانت النتائج كما يلي: إن ١٠٠٪ هى نسبة الشرائح التى تميزت بإحتفاظ مادة اللصق الجديدة بشفافيتها وعدم أكتسابها أى لون، عدم ظهور تغير فى اللون أو أشكال التراكيب الموجودة فى المسحات أو المقاطع النسيجية المثبتة على تلك الشرائح، وكذلك عدم ظهور آثار لتكوين رواسب بسبب مادة اللصق الجديدة. و ٩٠.٥٪ هى نسبة الشرائح التى لم تظهر فى مسحاتها أو مقاطعها النسيجية فقاعات هوائية. أما النتائج لكلا الإنتاجين المحلى والاجنبى من مادة طلاء الاظافر كانت متشابهة ولم تظهر بينهما فروق تذكر. نستنتج من هذه الدراسة أن نتائج الأختبارات التى ذكرناها كانت مقنعة، وإن مادة طلاء الأظافر الشفافة و عديمة اللون من الأنتاجين كلاهما تصلح لاستخدامها كوسط لصق دائمى للشرائح المجهرية.

Introduction

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In order for smears or tissue sections to be preserved and studied under the microscope, it must be mounted in a suitable medium . The mounting medium permits the spacing of smear materials or tissue , improving the index of refraction. As the slide dries , most solvent from the mounting medium evaporates , leaving the sections or smear enclosed in an almost solid substance [1] .

Mounting medium has been used in microscopy since 1832 . A long list of different types of mounting media are available , these media are either natural resins e.g. Canada balsam and Gum damar , or synthetic resins e.g. Pro-tex , Permount , Histoclad [1,2] .

The mounting media should : * provide good optical contrast , i.e. suitable index of refraction, * be somewhat viscous for specimen stability, * be easy to manufacture with easily available materials, * be stable over a period of time, * not react with stains, * be relatively non – toxic, * must be colourless, * solidify within a short period of time, * keep the preparations in high quality even after several years [1,2]

Colourless clear fingernail polish is a very common cosmetic material, thus it is easy to find and buy [2] . Formulae of products like fingernail polish are seldom found in books or other open literature, but mainly in patents . The choice of ingredients, compared with other varnishes is mainly limited by regulation concerning toxicology .

The classic film-forming polymer in fingernail polish is nitrocellulose, camphor makes the film flexible (erenesulfonamide formaldehyde resins) , coupler and diluent [4].

Colourless clear fingernail polish refractive index is equal, to 1.58 which is recommended as a mounting medium, in addition to that, the slide dries in no more than an hour [1,2]

In microbiological laboratories the fingernail polish material predominantly has been used in sealing the edges of coverslip with water soluble mounting media [1,5,6,7] .

This study has been designed to evaluate the material of colourless clear fingernail polish (local and foreign brands) as a permanent mounting medium for microscopic slides .

Materials and Methods

- 1) Colourless clear fingernail polish local brand .
- 2) Colourless clear fingernail polish foreign brand .
- 3) Canada balsam mounting medium

Eighty eight slides were divided in to 4 groups .

Group 1

Twenty two slides of stained tissue sections . Autopsy was performed on the hamster and specimens from intestine and livers were excised and fixed in Zinker formalin fixative , embedded in paraffin , sectioned and stained with hematoxylin & eosin for histologic studies .

Group 2

Twenty two slides of blood films stained with Leishman's stain [8] .

Group 3

Twenty two slides of stool smears stained with iron-hematoxylin [9] ,(stool sample was positive to parasitic organisms) .

Group 4

Twenty two slides of stool smears stained with trichrome stain [8] , (stool sample was positive to parasitic organisms) .

All slides were mounted in January 1997 .

The same mounting procedure was applied for both Canada balsam and colourless clear fingernail polish which was as follows :

- (One) Two drops of mounting medium were placed just above the tissue section or smear.
- (Two) By using a forceps the coverslip was picked up by its extreme lower edge (centrally) and line up top edge of coverslip to the globel of mounting medium .
- (Three) Draw coverslip down and lower it at the same time and draw the mounting down to and position it evenly over tissue sections or smear . Media and coverslip were both brought flush to the lower edge of the slide [1] .
- (Four) The air bubbles were checked during mounting process . They were removed either by a gentle press on coverslip by a finger, this procedure was used if smears were mounted with colourless clear fingernail polish , or by using a warm stage if smears were mounted with Canada balsam (Figure 1) .

In each group ten slides were mounted with colourless clear fingernail polish (local brand) , another ten slides were mounted with colourless clear fingernail polish (foreign brand) and two control slides were mounted with Canada balsam .

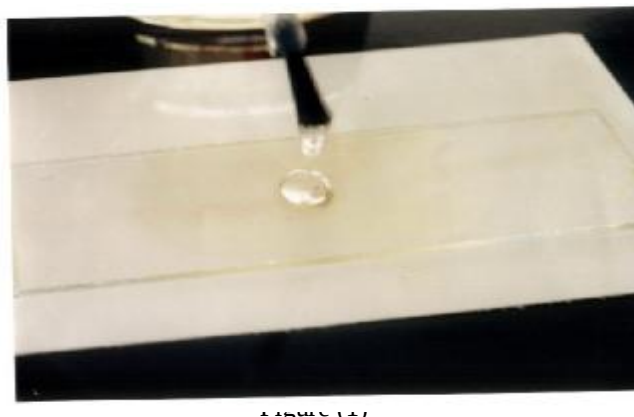


Figure 1

Photograph shows the method of addition of the two drops of colourless clear fingernail polish material when it was applied as a mounting medium on the zone of stained smear which was fixed on the slide .

During the period between January 1997 to January 2004 all mounted slides have been followed up , and each slide has been checked periodically every four months by macroscopic and microscopic examinations . Results of examinations for test slides of each sample were compared with control slides of the same sample .

Macroscopic examination included the following :

- ◆ Adherence of coverslip on the slide .
- ◆ Colour of the mounting medium for the whole period of the follow-up .
- ◆ Formation of the air bubbles , after mounting process and for the whole period of the follow-up .

Microscopic examination included the following :

- ◆ Colour of the mounted stained smears during the period of the follow-up .
- ◆ The morphological changes of the cells and other structures in the mounted smears or tissue sections .
- ◆ Formation of precepitates .

Results

Both local and foreign brands of colourless clear fingernail polish show closely similar results in all examinations .

Macroscopic Examination

- ◆ Within one hour the colourless clear fingernail polish medium dried after mounting process , and the incidence of the coverslips which showed a firm adherence to the slides and remained stable along the period of the follow-up was 100% (80) .
- ◆ The incidence of slides that showed stability in the colourless of the mounting medium during the whole period of the follow up was 100% (80) .
- ◆ The incidence of slides which showed stability against air bubble formation was 90.5% (76) . Air bubbles appeared in 4 slides, 2 slides in group 3 and 2 slides in group 4, whereas as the coverslips showed a stable adherence to these slides for the whole period of the follow-up.(Table 1) (Figures 2 &3) .



Figure (2)

Photograph shows two slides at the end of the follow up period , each slide includes fixed stained stool smear which was mounted with the material of colourless clear fingernail polish. The mounting medium appears clear, colourless, and without any appearance of air bubble.



Figure (3)

Photograph shows two slides at the end of the follow up period , each slide includes fixed stained tissue sections which was mounted with the material of colourless clear fingernail polish. The mounting medium appears clear, colourless, and without any appearance of air bubble.

Table (1) Macroscopic examination of 80 slides which was mounted with a material of colourless clear fingernail polish (local and foreign brands) during follow-up period .

Table (1)

Sample	Stain	Stable adherence of coverslip to the slide		Stability of mountant colourless		Absence of air bubble	
		NO.	%	NO.	%	NO.	%
Tissue Sections	Hematoxylin & eosin	20	100	20	100	20	100
Blood film	Leishman	20	100	20	100	20	100
Stool	Iron-hematoxylin	20	100	20	100	18	

					90
Stool	Trichrome	20	100	20	100
				18	90
Total		80	100	80	100
				76	90.5

Microscopic Examination

- ◆ The incidence of slides showed stable colouration of their stained smears or their tissue sections after applying the material of colourless clear fingernail polish, and during the whole period of follow-up, was 100% (80) .
- ◆ The incidence of slides showed morphological characteristics of their cells and other structures was 100% (80), The structures were found in smears or tissue sections mounted with a material of colourless clear fingernail polish .It ppear closely similar in shape to the cells and other structures which were found in the smear or tissue sections of the same samples, which were mounted with canada balsam,.
- ◆ In each group , the comparison between test slides and control slides during the whole period of the follow-up reveal a close similarity in the presence or absence of precipitates , the incidence of test slides, which showed a stability against precepitates formation was 100% (80) . (Table 2) .

Table (2) Microscopic examinations of 80 slides which were mounted with a material of colourless clear fingernail polish (local and foreign brands) during follow up period.

Table (2)

Sample	Stain	Stable colour of a mounted stained smear		Stable shape of cells and other structures in a mounted smear		Absence of Precepitates formation	
		NO.	%	NO.	%	NO.	%
Tissue section	Hematoxylin&eosin	20	100	20	100	20	100
Blood film	Leishman	20	100	20	100	20	100
Stool	Iron-hematoxylin	20	100	20	100	20	100
Stool	Trichrome	20	100	20	100	20	100

	80	100	80	100	80	100
Total						

Discussion

Most results of this study which are obtained from the periodic examinations of slides which were mounted with a material of colourless clear fingernail polish (local and foreign brands), show a similarity with characteristics of synthetic resins mounting media which are characterized by the following qualities: They are natral, less viscous, do not darken or become acidic , and dry faster. The high melting point of the synhetic mounting media makes them preferable for microprojection with no fear of melting or creating bubbles [1]. On the other hand ,and according to the results of this study, it may be suggested that the material of colourless clear fingernail polish (local and foreign brands) have most of the necessary

conditions of permanent mounting medium. Many researchers report that, the permanent mounting medium must be stable over a period of time, not react with stains, solidify within a short time and keep preparations in high quality even after several years[1, 2, 10]. These results indicate that the material of colourless clear fingernail polish (both local and foreign brands) may be considered as a suitable permanent mounting medium for microscopic slides.

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