Generic Report 2024

TECHNICAL MODULE IAPMD QAP 2024

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Technical Module IAPMD QAP Organiser

TM24-1 : Processing, Sectioning and H&E Staining

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TM24-2 : Mucicarmine Stain

Registration and Acceptance Status of TM IAPMD QAP 2024

This is a report of Anatomic Pathology laboratories involvement in the TM IAPMD QAP 2024. In this current exercise, the registration for all 16 participants was managed by Innovz Sdn. Bhd. All laboratories participated in the TM24-1, whereas 11 participated in TM24-2. The participants included 14 from the Ministry of Health Malaysia hospitals' laboratories and 2 teaching hospitals' laboratories.

This exercise consisted of two modules: TM24-1 (processing, sectioning, Haematoxylin and Eosin staining) and TM24-2 (Mucicarmine stain). As for the questionnaire, all responded to both TM24-1 and TM24-2 questionnaires. All participants submitted appropriate tissue types for TM24-1, and TM24-2 for assessment.

INSTRUCTIONS TO PARTICIPANTS

CLINICAL NOTES

Code	Exercise	Clinical Notes
TM24-1	• Processing and Sectioning • Haematoxylin and Eosin (H&E) staining	• Tissue type: Colon/ Appendix/ Small intestine tissue • Appropriate section size
TM24-2	• Mucicarmine stain	• Tissue type: Colon/ Appendix/ Small intestine tissue

ASSESSMENT CRITERIA

Processing, Sectioning and H&E Stain (TM24-1)	Mucicarmine Stain (TM24-2)
Processing and Sectioning 1. Preservation of the general tissue architecture e.g., nuclear and cytoplasmic details. 2. Appropriate thickness of tissue section. 3. Absence of knife lines, chatter, compression or over-expansion. 4. Absence of bubbles and excess mounting 5. Absence of artefacts from dehydration, clearing and mounting. **H&E Staining** 1. The effectiveness in demonstrating nuclear membranes, nucleoli, chromatin of vesicular and hyperchromatic nuclei. 2. The effectiveness in demonstrating all non-nuclear material e.g., cytoplasm, fine and dense connective tissue fibres, skeletal and smooth muscle and red blood cells (where present). 3. Adequate contrast between haematoxylin & eosin. 4. Uniformity of staining across slide. 5. Absence of contaminants.	1. Effectiveness in demonstrating the epithelial mucin. 2. Minimal background staining. 3. Counterstain quality – complementary not obscuring (where used). 4. Staining result suitable for diagnostic reporting. 5. Uniformity of staining across the slide. Absence of contaminants. 6. Absence of artefact from dehydration, clearing and mounting.

- Assessment result (Total mark out of 5):
  - Unsatisfactory <2.5
  - Borderline 2.5 - 2.9
  - Satisfactory >3

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Questionnaire analysis of TM24-1

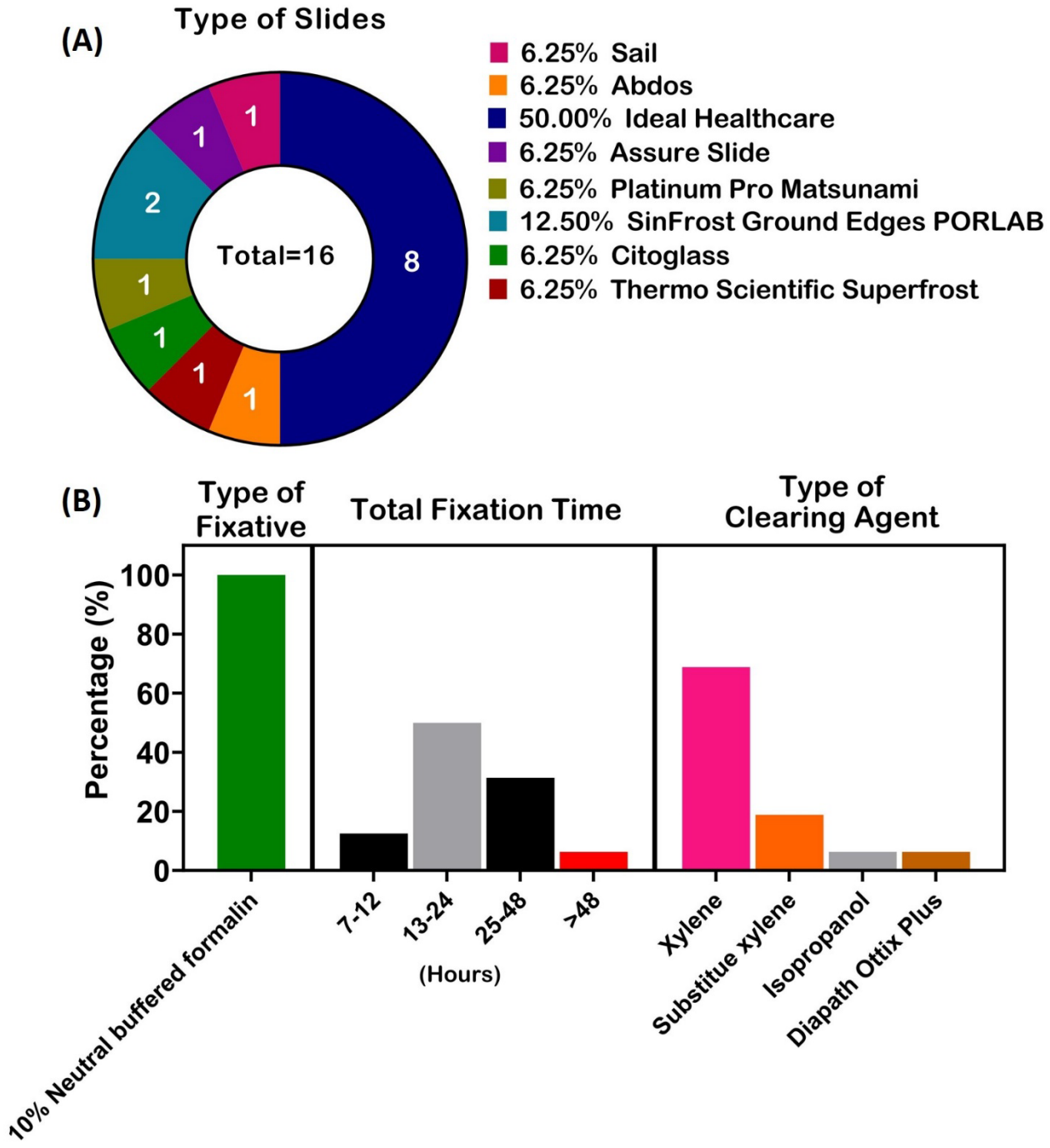

Figure 1: Responses to the questionnaires on type of slides and tissue processing

Pie and bar charts showing the survey results from 16 laboratories comprising of (A) type of slides; (B) i) type of fixative applied; ii) total of fixation time; and iii) type of clearing agent used.

Summary notes:

1. The Ideal Healthcare slide brand emerged as the commonly employed choice among the surveyed laboratories, constituting 50% of utilisation.
2. All participating laboratories utilised 10% neutral buffered formalin* in tissue processing as the fixative (* included neutral buffered formalin and 10% buffered formalin).
3. It was observed that the fixation times for tissue processing frequently surpassed a duration of 13-24 hours.
4. The types of clearing agents employed for tissue processing are xylene, substitute xylene, isopropanol and Diapath Ottix Plus. Among these, Xylene emerged as the prevailing clearing agent employed.

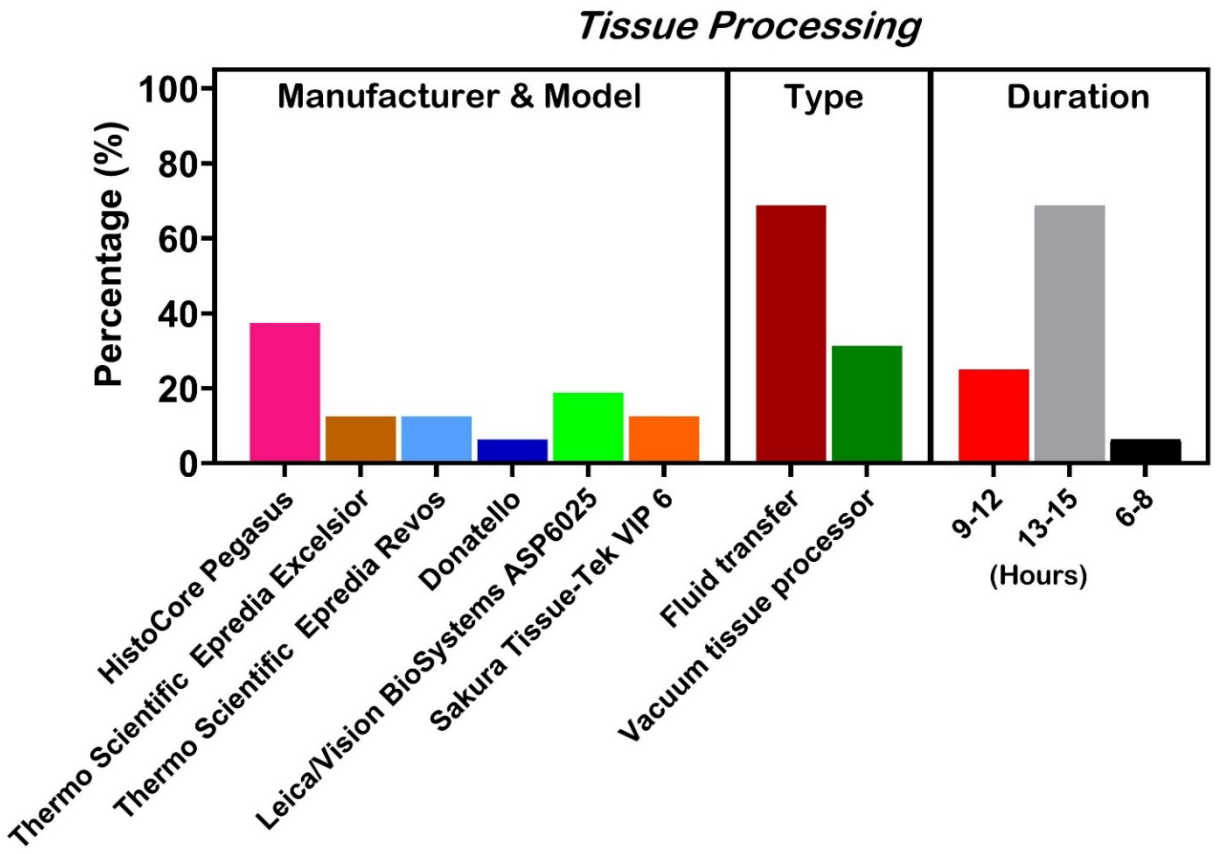

Figure 2: Responses to the questionnaires on tissue processing

Bar charts showing the survey results from 16 laboratories comprising of (i) the model of tissue processors used; (ii) type and (iii) duration of tissue processing.

Summary notes:

1. The HistoCore Pegasus tissue processor (Leica Biosystems) model was identified as the prevalent choice among the surveyed laboratories, accounting for 37.5% of usage.
2. The technique of fluid transfer was widely employed in tissue processing by the laboratories involved in the survey.
3. The most frequent tissue processing duration was between 13 and 15 hours.

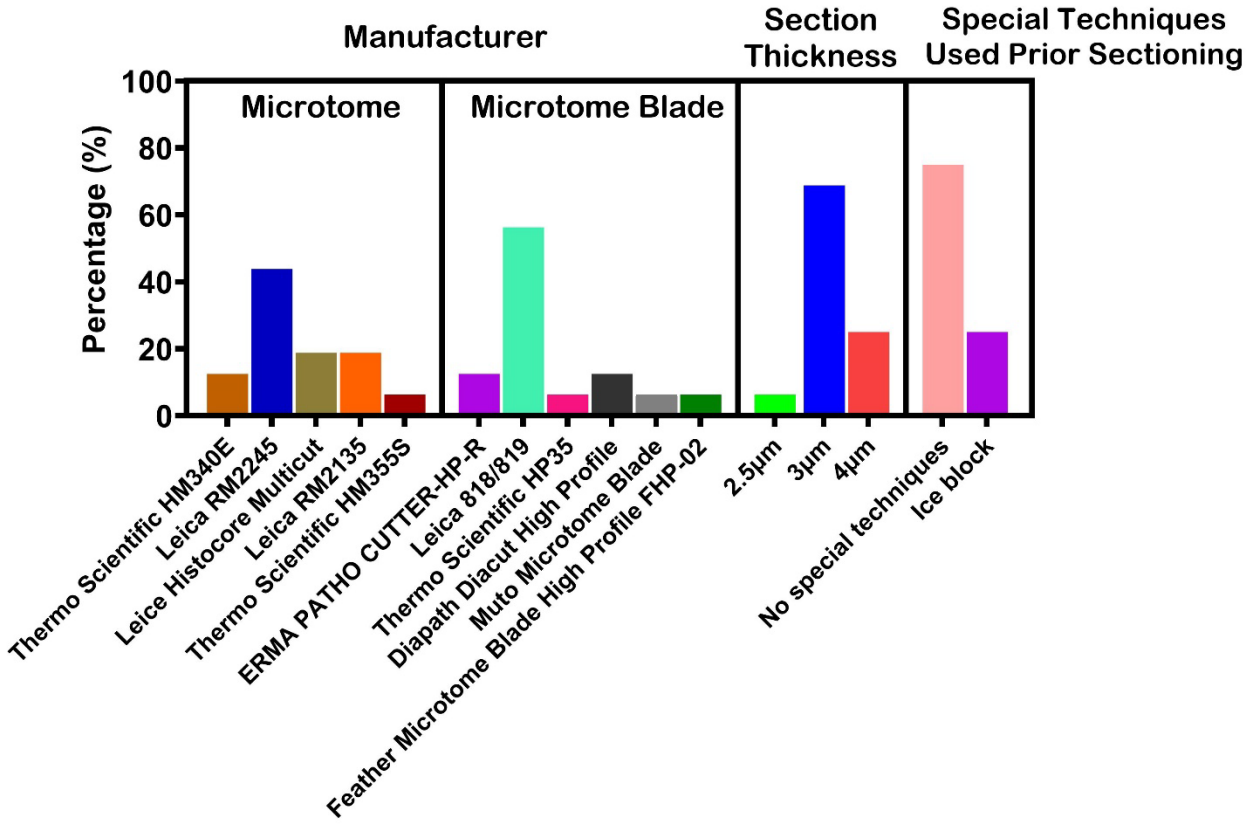

Figure 3: Responses to the questionnaires on tissue sectioning

Bar charts showing the survey results from 16 laboratories comprising of (i) type of model of microtome and microtome blade used; (ii) section thickness; and (iii) type of special techniques used before sectioning.

Summary notes:

1. The Leica RM2245 microtome (43.8%) and the Leica 818/819 microtome blade model (56.3%) were frequently employed in the survey.
2. The thickness of 3 µm for tissue sections was the preferred choice.
3. Preceding the process of tissue sectioning, the findings from the survey indicate that majority of laboratories (75%) did not utilise any special techniques. Ice block treatment was found to be the least utilised method (25 %).

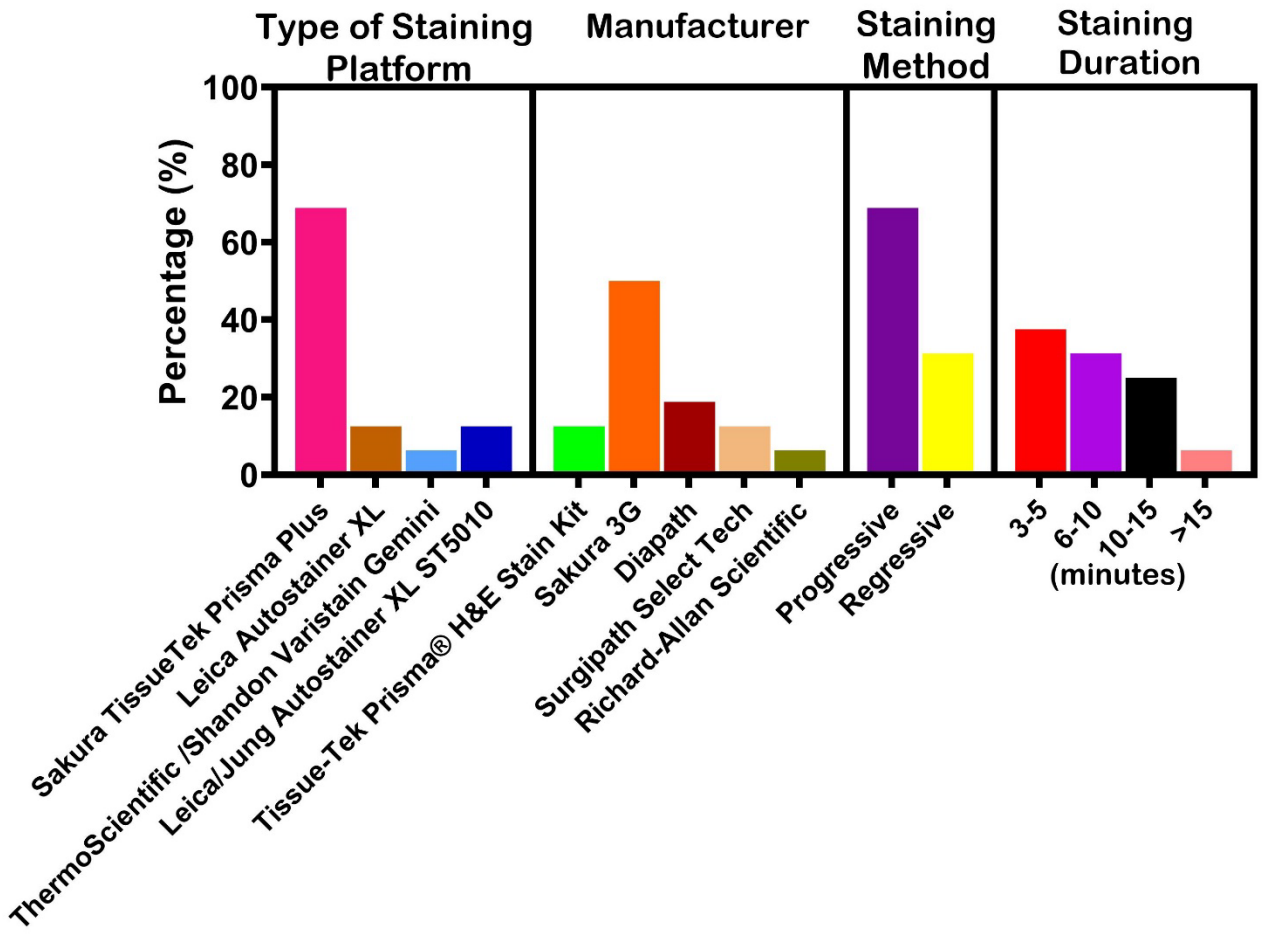

Figure 4: Responses to the questionnaires on haematoxylin in H&E staining

Bar charts showing the survey results from 16 laboratories comprising of (i) type of staining platform; (ii) manufacturer of staining solution; (iii) staining method; and (iv) staining duration.

Summary notes:

1. The Sakura Tissue Tek Prisma Plus (68.8 %) was the most common tissue staining platforms utilised.
2. Sakura 3G (50 %), Diapath (18.8 %) and Surgipath Select Tech (12.5 %) emerged as the top three manufacturers for haematoxylin.
3. The progressive staining approach garnered the highest preference as the staining method of choice.
4. The staining duration of haematoxylin that is most favoured falls within the range of 3-5 minutes.

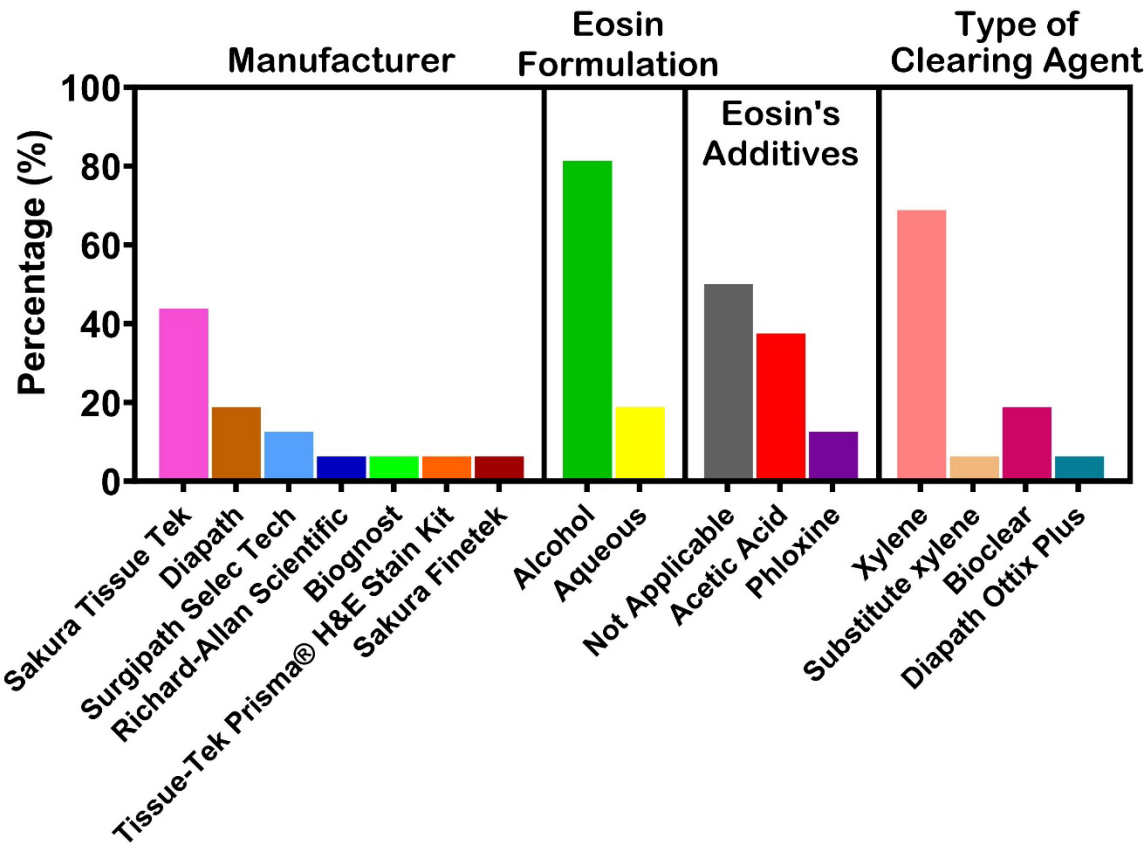

Figure 5: Responses to the questionnaires on eosin in H&E staining

Bar charts showing the survey results from 16 laboratories comprising of (i) manufacturer of eosin staining solution; (ii) eosin formulation; (iii) eosin's additive; and (iv) type of clearing agent used.

Summary notes:

1. The eosin staining solution produced by Sakura Tissue Tek received the highest favourability (43.8 %).
2. Alcohol-based solvent was predominantly favoured over aqueous solvent for eosin formulation.
3. Half of the surveyed laboratories (50 %) opted from using additional solutions in the eosin formation process. However, a subset of laboratories utilised acetic acid and phloxine.
4. The preferred clearing agent for eosin staining in H&E was xylene, followed by Bioclear.

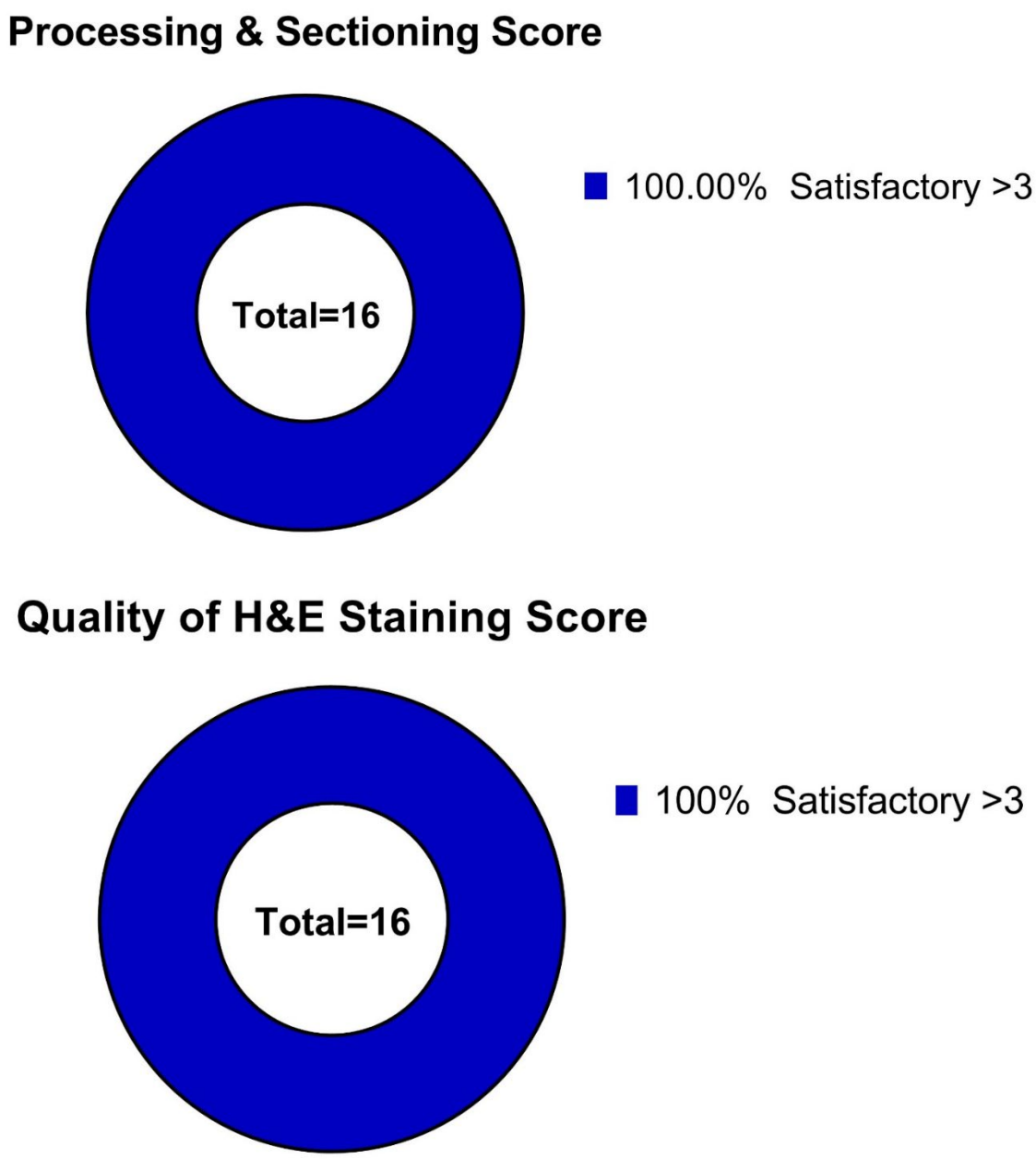

Figure 6: Technical assessment on the quality of tissue processing and H&E staining

Pie chart showing the quality of tissue processing and H&E staining analysis from 16 laboratories.

Summary notes:

1. The tissue processing and sectioning quality met the satisfactory criteria for 100% of the participating laboratories. The highest and lowest scores were 4.9 and 3.4, respectively.
2. All of the participating laboratories achieved satisfactory scores for H&E tissue staining. The highest and lowest scores were 4.9 and 3.4, respectively.

Questionnaire analysis of TM24-2

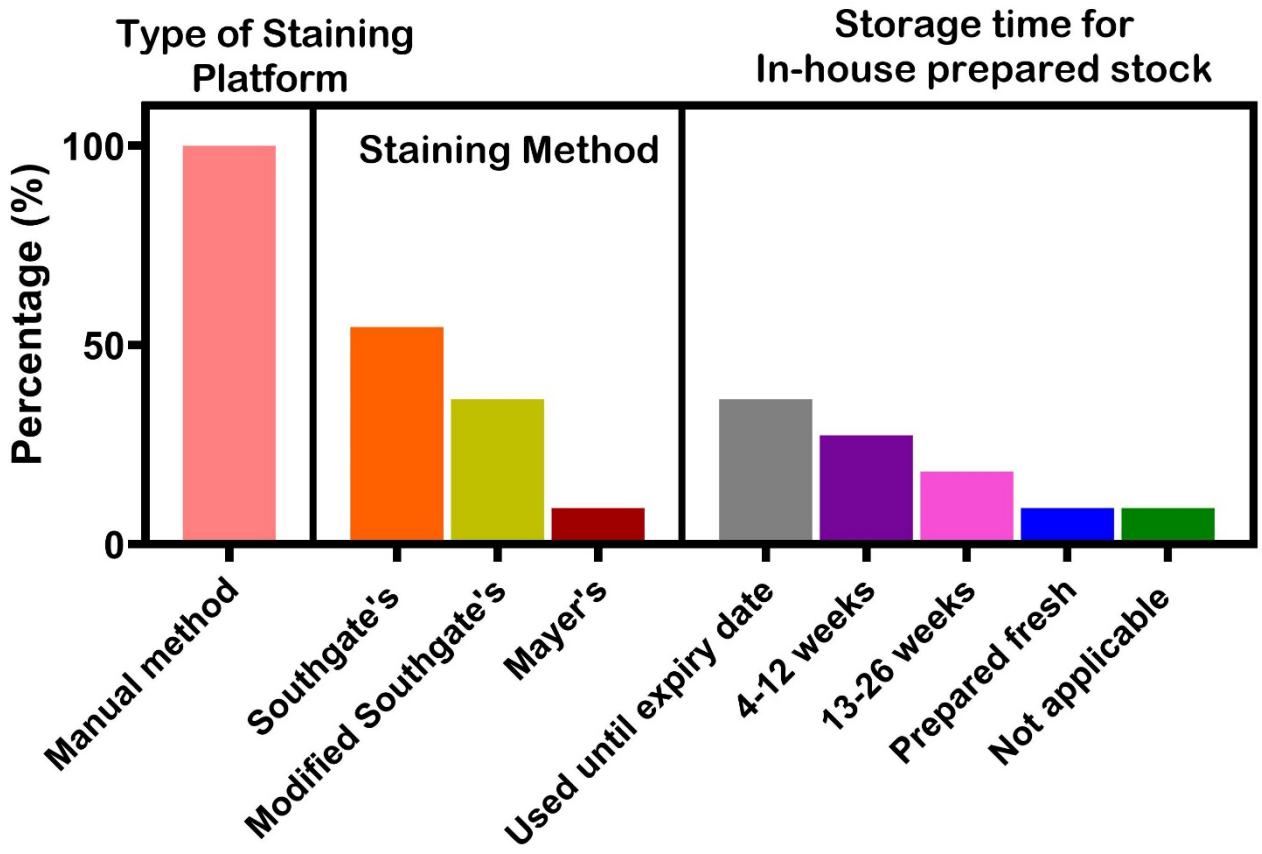

Figure 7: Responses to the questionnaires on Mucicarmine staining

Bar charts showing the survey results from 11 laboratories comprising of (i) the type of staining platform; (ii) type of staining methods; and (iii) duration of storage time for in-house prepared stock solution.

Summary notes:

1. All participating laboratories used the manual method.
2. The most popular method for Mucicarmine staining was Southgate's (54.5%).
3. In terms of stock solution usage, 36.4% laboratories utilised in-house prepared stock solutions until their expiry dates.

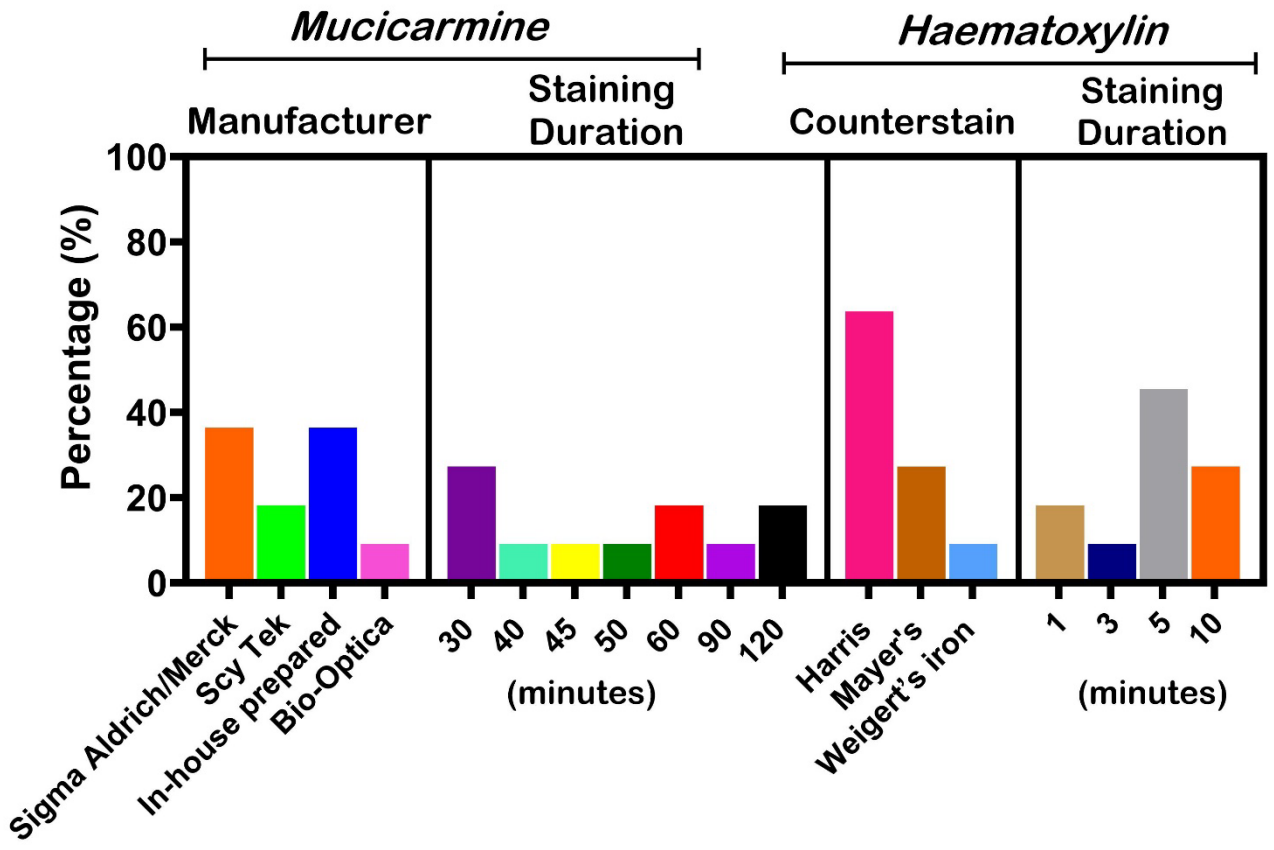

Figure 8: Responses to the questionnaires reagents used in Mucicarmine staining

Bar charts showing the survey results from 11 laboratories comprising of (i) manufacturer of Mucicarmine and Haematoxylin staining solutions; and (ii) the respective staining duration.

Summary notes:

1. Sigma Aldrich/Merck (36.4%) emerged as the predominant manufacturer of Mucicarmine, with an equal distribution among participating laboratories choosing to utilize in-house prepared Mucicarmine staining solutions manually.
2. The predominant staining durations applied by the majority of surveyed laboratories for Mucicarmine and haematoxylin were 30 minutes and 5 minutes, respectively.
3. Harris haematoxylin (63.7%) was the top choice of counterstaining reagent in Mucicarmine staining.

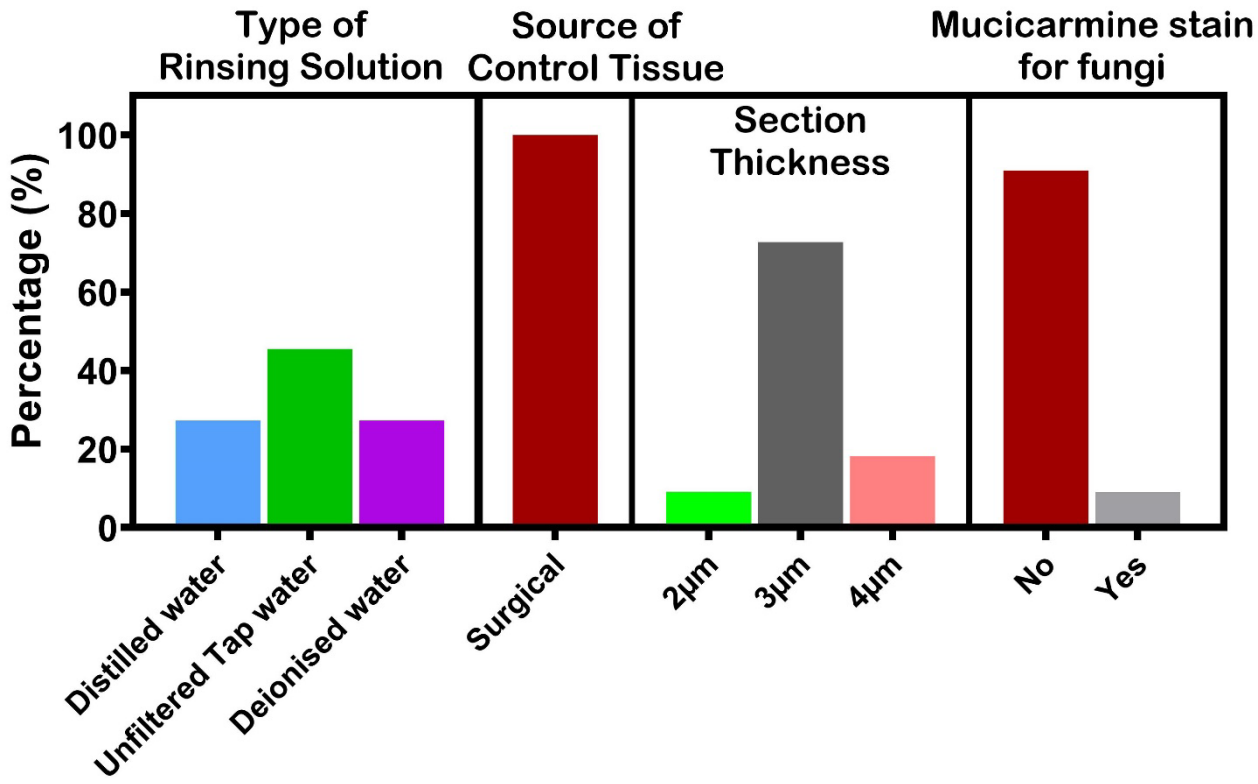

Figure 9: Responses to the questionnaires reagents used in Mucicarmine staining

Bar charts showing the survey results from 11 laboratories comprising of (i) type of rinsing solution; (ii) source of control tissue; (iii) section thickness; and (iv) identification of fungi using Mucicarmine stain.

Summary notes:

1. The rinsing solution of choice for the majority of surveyed laboratories (45.5%) was unfiltered tap water, while an equal percentage of laboratories opted for either filtered or deionised water.
2. For this exercise, all control tissues utilised were sourced from surgical tissues, with none being derived from post-mortem or commercially sourced tissues.
3. The preferred thickness for tissue sections in Mucicarmine staining was 3 µm (72.7%), with only a few laboratories utilised 4 µm thickness for their tissue sections.
4. Only one laboratory using Mucicarmine stain for the identification of fungi.

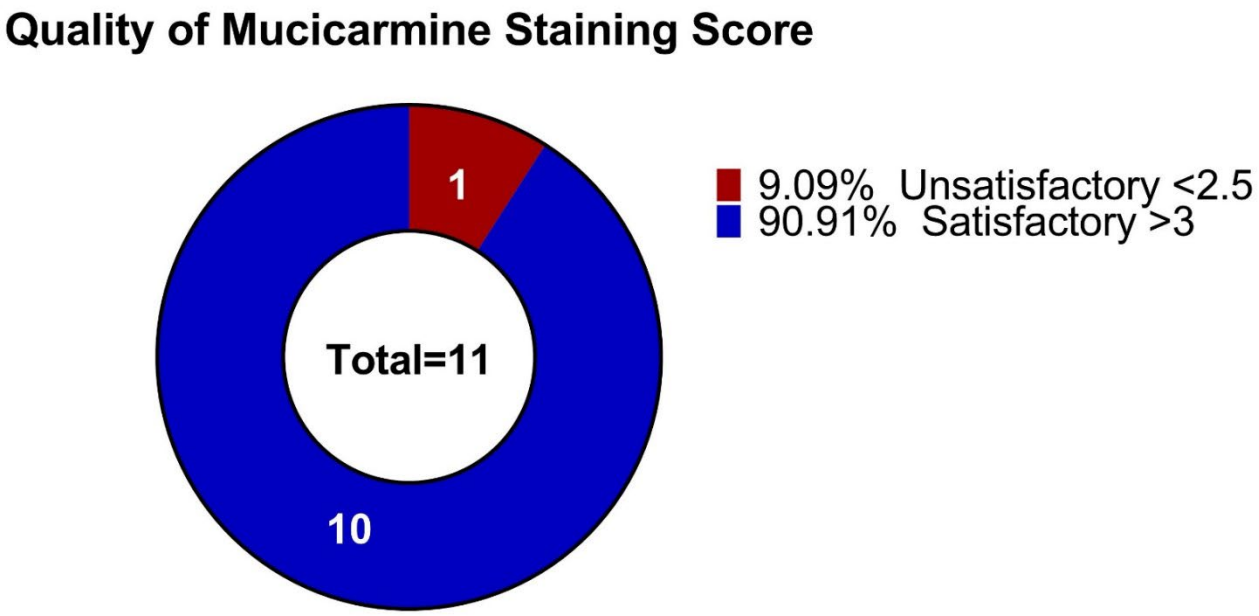

Figure 10: Technical assessment on the quality of Mucicarmine staining

Pie chart showing the quality of Mucicarmine staining analysis from 11 laboratories.

Summary notes:

1. The satisfactory scores for Mucicarmine staining were attained by a significant majority of the participating laboratories (90.91%), whereas 9.09% of the laboratories received unsatisfactory scores. The highest and lowest scores were 4.4 and 2.3, respectively.