Research Article

The Efficiency of Corn Solution as a Cytological Fixative in Buccal Smear

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ABSTRACT

Background: Corn Syrup is food syrup higher of carbohydrate, depending on grade. The study aimed to assess efficiency of Corn syrup as cytological fixative.

Subjects and methods: This was laboratory based study, it has been conducted at Elrazi University included apparently 30 healthy students have been involved in this study.

Results: Out of 30 smears fixed with 95% alcohol, 76.7% (n=23) shows excellent nuclear stain, 23.3% (n= 7) shows good nuclear stain. 70% (n=21) show excellent cytoplasmic stain, 26.7% (n=8) shows good cytoplasmic stain, 3.3% (n=1) shows poor cytoplasmic stain.

Out of 30 smears fixed with corn solution, 60% (n=18) shows excellent nuclear stain, 40% (n=12) good nuclear stain, 3.3 % (n=1) shows excellent cytoplasmic stain, 83.3% (n=25) shows good cytoplasmic stain, 13.3% (n=4) shows bad cytoplasmic stain.

Conclusion: Study concluded that Corn syrup can be used as cytological fixative alternatively to 95% ethyl alcohol.

Exfoliative cytology is the microscopic study of cells shed or obtained from body especially for diagnostic purposes (as in determining the presence or absence of cancerous condition) (5).

Corn syrup can also be used as a good cytological fixative alternatively to common 95% ethanol alcohol.

Fixation is an important step in cytological diagnosis and the basis or foundation of cytological technique. Ethanol is traditionally a popular and widely used fixative for cytological diagnosis. Commercially ethanol is expensive and not freely available in some institution, flammable, beside its toxicity, it has a
pungent, irritating odor. Corn syrup is less costly, harmless, eco-friendly, well suited for laboratory processing and staining (5). The study aimed to assess efficiency of Corn syrup as cytological fixative.

Subjects and Methods

This was laboratory-based study, it has been conducted at Elrazi University included apparently 30 healthy students have been involved in this study.

Ethical approval and consent to participate

Ethical approval was obtained from Ministry of Health Ethical Research Committee in accordance with the Declaration of Helsinki Principles, and the agreement was taken from all hospital administration before sample and data collection. The patient’s information were highly secured and not used for other purposes than scientific inquiry.

Each participant was asked to sign a written ethical consent form during the interview, before the specimen was taken.

Ethical clearance code number: MH-RES/8-021-09
Date: 3/5/2021

Statistical analysis:

Data was analyzed using statistical package for social science software version (20) SPSSV20 (IBM Corp, Armonk, NY, USA).

Method of specimen collection:

A commercially available tongue depressor was used for the collection of the samples. The scraps were smeared onto the center of the glass slides and spread over a large area, preventing the clumping of cells. The smears were immediately fixed with 95% alcohol (control) and corn syrup (test) (6).

Corn syrup preparation:

30 g of corn were boiled with 300 ml of water and then filtered to remove any excess deposits. Then we added 45 g of sugar and 3.5 ml of lemon juice to the filtered syrup and boiled it again till it gains its viscosity. The syrup has diluted first before fixation, 1:2 with DW (5).

Staining technique:

The smears were fixed by corn syrup for 15-30 min, then it was treated with 70% alcohol 2 min, rinse in Distilled water 3 min, stain with Harris’s for 3 min, wash by water, differentiated by 1% acid alcohol for seconds, rinse in water then dehydrate in 70% alcohol for 2 min, stain with Orange G6 for 2min, then rinse in 95% alcohol (2) for 2 min, then 95% alcohol (1) 2 min, stain Eosin Azure for 3 min, rinse in 95% alcohol (2) 2 min, then 95% alcohol (1) for 2 min, mount cover slip with DPX (Distyrene, plasticizer and xylene), to be examined by light microscopically (6).

Staining assessment:

- Nuclei appear blue/black.
- Cytoplasm blue/green.
- Keratinizing cell pink-orange

Assessment of cytological smears for staining quality

The smears were assessed and evaluated by an experienced cytotechnologist. For comparative analysis of both techniques, parameters such as thickness, cellular distribution were evaluated, adopting criteria reported elsewhere (7; 8). Also, given that a good staining method must show the shapes and sizes of the cell, provide crisp delineation of nuclear chromatin, and demonstrate the cytoplasm, each slide was evaluated as follows: (i) excellent;(ii) good; (iii) poor. All parameters were compared to standard parameters illustrated elsewhere, (9) and the degrees were given (10).

Results

From each case involved in this study two samples have been collected, one sample was fixed with 95% ethanol alcohol as control, while the other was fixed with corn syrup as test.

Out of 30 smears fixed with 95% alcohol, 76.7% (n=23) shows excellent nuclear stain, 23.3% ( n= 7) shows good nuclear stain. 70% (n=21) show excellent cytoplasmic stain, 26.7% (n=8) shows good cytoplasmic stain, 3.3 % (n=1) shows poor cytoplasmic stain.

Out of 30 smears fixed with corn solution, 60% (n=18) shows excellent nuclear stain, 40% (n=12) good nuclear stain, 3.3 % (n=1) shows excellent cytoplasmic stain, 83.3% (n=25) shows good cytoplasmic stain, 13.3% (n=4 ) shows poor cytoplasmic stain.

Out of 30 smears fixed with 95% alcohol, 76.7% (n=23) shows excellent nuclear stain , 23.3% ( n= 7) shows good nuclear stain. Out of 30 smears fixed with corn solution , 60% (n=18) shows excellent nuclear stain, 40% (n=12) good nuclear stain. This result shows no significant variation between corn solution and 95% ethanol alcohol in nuclear stain ( P value=0.165 ), as showing in table (1).

<table>
<thead>
<tr>
<th>Type of agents</th>
<th>Quality of nuclear stain</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn solution</td>
<td>12(40.0%)</td>
<td>30(100.0%)</td>
</tr>
<tr>
<td>95% ethyl alcohol</td>
<td>7(23.3%)</td>
<td>30(100.0%)</td>
</tr>
<tr>
<td>P value=0.165</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Out of 30 smears fixed with 95% alcohol 70% (n=21) show excellent cytoplasmic stain, 26.7% (n=8) shows good cytoplasmic stain , 3.3 % (n=1) shows poor cytoplasmic stain. Out of 30 smears fixed with corn solution 3.3 % (n=1) shows excellent cytoplasmic stain, 83.3% (n=25) shows good cytoplasmic stain, 13.3% (n=4 ) shows poor cytoplasmic stain. This result shows highly significant variation between corn solution and 95% ethyl alcohol in cytoplasmic stain (P value=0.000 ), as showing in table (2).

<table>
<thead>
<tr>
<th>Type of agents</th>
<th>Quality of cytoplasmic stain</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn solution</td>
<td>4(13.3%)</td>
<td>30(100.0%)</td>
</tr>
<tr>
<td>95% ethyl alcohol</td>
<td>1(3.3%)</td>
<td>30(100.0%)</td>
</tr>
<tr>
<td>P value= 0.000</td>
<td></td>
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</table>
Discussion
In this study we compare between 95% ethanol alcohol and corn syrup as cytological fixative, the procedure of fixation with corn syrup is inexpensive.

From each case involved in this study two samples have been collected, one sample was fixed with 95% ethanol as control, while the other was fixed with corn syrup as test.

Out of 30 smears fixed with 95% alcohol, 76.7% (n=23) shows excellent nuclear stain, 23.3% (n=7) shows good nuclear stain. 70% (n=21) show excellent cytoplasmic stain, 26.7% (n=8) shows good cytoplasmic stain, 3.3% (n=1) shows poor cytoplasmic stain.

Out of 30 smears fixed with corn solution, 60% (n=18) shows excellent nuclear stain, 40% (n=12) good nuclear stain, 3.3% (n=1) shows excellent cytoplasmic stain, 83.3% (n=25) shows good cytoplasmic stain, 13.3% (n=4) shows poor cytoplasmic stain.

All the smears in both group was satisfactory. It shows good fixation and also good staining intensity of oral squamous cells and background which agreed with previous study (5; 11; 12).

Conclusion
Study concluded that Corn syrup can be used as cytological fixative alternatively to 95% ethyl alcohol.

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Conflict of Interest
No conflict of interest

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REFERENCES

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