Microwave assisted irradiation in tissue preparation: From fixation to staining

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Abstract
Fixation, which is the first step in tissue preparation in histopathology laboratories, followed by tissue processing, embedding and staining. Routine use of formalin fixation, dehydration, paraffin infiltration, embedding and sectioning gives uniform and well preserved tissue structure closest to the live one. These routine procedures take at least 1 to 4 days, depending on the technique used. In this study it is aimed to assess microwave assisted irradiation in tissue fixation, processing and staining and to determine if it can be replaced routine formalin fixed paraffin embedded tissue preparation. For this purpose, liver and kidney pieces taken from rats were fixed with microwave irradiation. After fixation; tissue dehydration, clearing (1,1,1 trichloroethane), impregnation and staining steps were all performed in the microwave oven. When the results were compared with the standard protocol there was no statistically significant difference in terms of morphology as structural preservation and staining quality. All tissue preparations carried out in microwave oven were completed in 2 hours and 10 minutes. Because of the ease of application and speed of the technique; this microwave assisted tissue preparation technique can be used as an alternate in histopathology laboratories for rapid diagnosis. For example formaline fixed parafine embedded tissues stored for longer period had a reduced concentration and quantity of extractable protein, RNA and DNA. Especially in precision oncology for detecting somatic variations; it can be speculated that our microwave assisted tissue preparation can be an alternative method for better quality of protein, RNA and DNA. To show this; an experiment will be planned for future directions.

Keywords. Microwave oven, Tissue preparation, Fixation, Tissue processing, 1,1,1 trichloroethane