EFFECTS OF *ARAK BALI* ADMINISTRATION ON SPERMATOZOA DNA FRAGMENTATION AND TESTOSTERONE LEVEL OF RATS (*Rattus norvegicus*)

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh pemberian arak bali terhadap fragmentasi DNA spermatozoa dan kadar testosteron tikus (Rattus norvegicus). Penelitian ini menggunakan 24 ekor tikus (170-200 g), dibagi menjadi empat kelompok: satu kontrol dan tiga perlakuan (diberi arak bali yang mengandung 40% alcohol sebanyak 0,1 dan 0,5 mL serta alkohol sintetis (40%) sebanyak 0,1 mL, selama 45 hari. Pengamatan DNA fragmentasi menggunakan pewarnaan acridine orange dan pengukuran kadar testosteron menggunakan metode ELISA. Hasil penelitian menunjukan bahwa pemberian arak bali pada hewan coba meningkatkan terjadinya fragmentasi DNA spermatozoa. Semakin besar volume arak bali yang diberikan, semakin tinggi fragmentasi DNA spermatozoa. Pemberian arak bali juga menurunkan kadar testosteron. Semakin besar volume arak bali yang diberikan, semakin rendah kadar testosteron tikus. ***(FMI 2018;54:41-45)***

Kata kunci*: Arak bali; fragmentasi DNA spermatozoa; testosteron; tikus (Rattus norvegicus)*

ABSTRACT

This study aimed to determine the effects of arak bali on the fragmentation of spermatozoa and testosterone in rats (Rattus norvegicus). This study used 24 rats (170-200 g), divided into four groups: one control and three treatments (receiving arak bali containing 40% alcohol as much as 0.1 and 0.5 mL and synthetic alcohol (40%) as much as 0.1 mL, for 45 days). The observation of DNA fragmentation was done using acridine orange staining and the measurement of testosterone level used ELISA method. The results showed that the provision of arak bali in experimental animals increased the occurrence of spermatozoa DNA fragmentation. The higher the volume of arak bali given, the higher the fragmentation of spermatozoa DNA. The administration of arak bali also decreased testosterone level. The higher the volume of arak bali given, the lower the rats' testosterone level. ***(FMI 2018;54:41-45)***

Keywords*: Arak bali; spermatozoa DNA fragmentation; testosterone; rats (Rattus norvegicus)*

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INTRODUCTION

Bali is an island with a variety of customs that are still sustainable to date. One of the customs that is preserved to date is presenting traditional drinks in every religious ceremony. Like traditional liquor, this drink is used as a complement to religious ceremonies. In addition to the ceremony, liquor is also consumed by the people of Bali. Arak, or traditional liquor, is usually made from fermented coconut water, nira (aren) fruit and rice water. This liquor has quite high alcohol content, so the liquor is divided into several grade levels. For grade I, it has alcohol content above 35%, class II has alcohol content 35 = × = 25%, while for class III, it has alcohol content of less than 25% (Lempang 2006).

Alcohol that enters the body will undergo a series of biochemical processes. Out of all alcohol consumed, 90% will be metabolized by the body, especially in the liver, by alcohol-dehenogenase (ADH) enzyme and nicotinamide-adenine-dinucleotide (NAD) coenzyme to acetaldehyde, and then by aldehyde dehydrogenase (ALDH) enzyme, it is converted to acetic acid. Alcohol metabolism in the liver involves three pathways: cytosolic, peroxisome, and microsomal pathways. Thee cytosol pathway mechanism is an oxidation process involving alcohol dehydrogenase (ADH) enzyme. Alco-hol metabolism by ADH will produce acetaldehyde, which is a highly reactive and toxic product that may cause damage to some tissues and cells. The mechanism of peroxisome pathway involves the hydrogen produced from alcohol metabolism that leads to changes in fat and carbohydrate metabolisms that result in the increase of collagen tissue, and, in certain circumstances, can inhibit protein synthesis. The microsomal pathway lies within endoplasmic reticulum. With the help of P-450 cytochrome enzyme, alcohol is decomposed into acetal-dehyde. The alcohol is converted to acetaldehyde, then converted to acetate by aldehyde dehydrogenase in mitochondria. Alcohol use for long periods of time will cause changes in mitochondria, leading to reduced capacity for fat oxidation (Zakhari 2006).