

Effects of Some Garlic(*Allium sativum*) Preparations on The Sexual Behavior and Alcohol Toxicity in Mice

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Abstract:-

This study was carried out to investigate the activities of crude, heated garlic and aged garlic extract in the testicular hypogonadism induced by warm water and alcohol toxicity .The results were showed that only crude garlic caused improvement of testicular function ,while the activity of warwed garlic did not improve this function with slight effect on the alcohol intoxication .The afficacy of aged garlic extract was significantly observed in two models.These results can be concluded that the three garlic preparations have different pharmacological characters and the aged garlic extract could be the most effective preparation in the experimental models.

Introduction:-

For along period,plants have proved to be a valuable source of natural products for maintaining human health (Tanaka etal, 2006) Different parts of plants ,herbs and spices have been used for many years for the prevention of infections.

Garlic (*Allium sativum*) has been used for medicinal properties for thousands of years to treat many conditions inculuding hypertension , infections and snake bite,also it was used for reducing cholesterol level and cardiovascular risk(Tattelman,2005) . It

also has beneficial effects on the immune system (Harris etal, 2001) .Garlic has been known to have antibacterial , antifungal and antiviral activity (Bakri and Douglas,2005).

This study was carried out to investigate the activities of different types of garlic preparations (Crude, warmed garlic and aged garlic extract) for improving the testicular function and alcohol toxicity.

Materials and Methods

I- Materials

1- Garlic preparation:-

a:Crude garlic:-was prepared

from skinned raw garlic cloves that were crushed in a blender for three minutes with equal weight of water. The mixture was allowed to stand for 1 hr at room temperature. The mixture was filtered and the crude garlic was prepared.

b: warmed garlic :was prepared from skinned raw garlic cloves that were heated to 100C for 30 minutes .

c:Aged garlic extract: The cloves were sliced and soaked in ethanol 95% and extracted for 5 months at room temperature.

2-Animals

Albino Swiss adult mice of both gender weighted (20-30)gm were obtained from the animal house of sera and vaccines institute and biotechnology center at Al-Nahrain university . Male mice were housed in groups of 5mice per plastic cage (30×10×10) cm . insulated room until the beginning of experiments .Female mice were housed in separated cages in the same manner . Standard rodent diet (commercial feed pellets) and tap water were available . Housing condition were maintained at $28 \pm 2C$ and light dark cycle (14/10 hrs) .The litter of the cages was changed every week .The experiments were conducted in the animal house of physiology and pharmacology department at veterinary medicine college of Baghdad university. They were divided into five groups (10mice for each one) for testicular function as follow:-

- a- The normal group: non treated group.
- b- The control group: treated water only.
- c- The third group: the crude garlic group treated with 5ml/ .kg B. w.daily for 15days.
- d- The fourth group: the warmed garlic group, treated with 5ml/kg B.W.daily for 15 days

e- The fifth group: the aged garlic extract group,treated with 5ml/kg B.W.daily for 15 days For the alcohol toxicity four groups of mice were used (10mice for each),the control group and the three treatment groups.

II) : Methods:-

1- The testicular function :-

Hypogonadism in mice was conducted using the method of (Amendola et al .1990) .Male mice were placed in cages and their pelvic regions were immersed in 42C° water for 30minutes.

After one day of warm water treatment garlic preparations were administered orally by stomach tube at doses of 5ml/kg B.w. daily for 15days. Each male mouse was mated with two estrus female mice becomes cornified which can be identified in the smear.The female mice in this stage under the influence of estrogen and the mounting occur in this stage (Turner and Bagnara , 1976). Male sexual behaviors was observed 15 day after treatments. All mounting behaviors were recorded during 30 minutes test period and the reaction time , the numbers of mounting were the parameters of mounting.

2- Alcohol toxicity :-

Four groups of mice were used , the first group was considered as a control groups and was only injected with alcohol 400mg/ kg B.w. intraperitoneally .The other three groups were administered orally by one of garlic preparation at adose of 40ml/kg B.w two hours before injection of alcohol i.p. at doses of 400mg/kg B.W. the mice surviving 5days after alcohol administration was counted, the survival rate was calculated.

Results:-

The effects of garlic preparation on testicular functions:

In non treated group (normal) which was not treated with warm water the appearance of mounting was 100%. They had 7 mountings within 30 minutes. The control group was showed significant reduce in appearance of mounting to 40%, they showed only 3.2 of mounting number. The third and fourth groups (crude and warmed garlic groups) and the fifth group (Aged garlic extract group), were showed inhibition in reduction of appearance of mountings (70%, 80% and 90%) respectively. The aged garlic extract had significantly improved the mounting behavior ($p < 0.05$).

The crude and warmed garlic had no effect on mounting counts (4 ± 1.2 and 4.8 ± 1.1) while the aged garlic extract inhibited the reduction in the number of mounting with significant effect 6.5 ± 1.3 . (Table I).

The alcohol toxicity :-

The ratio and period of survival of the mice after alcohol toxicity were listed in table 2.

The survival ratio of control group which injected with alcohol intraperitoneally was (0), all of the control mice died within 5 days after alcohol injection. The survival period was 0.5 day. The same results were observed in the crude garlic group with survival period of 0.7 day.

The warmed garlic was slightly effective in alcohol intoxication with 30% survival ratio and the mice in this group were survived for 1.8 ± 0.4 days after treatment. The aged garlic extract group was showed 70% survival ratio and was significantly prolonged the survival period of 3 days.

Table 1:-The activity of garlic preparation on reduced mounting behavior.

Groups	Appearance rate of mounting %	Number of mounting
Normal	100	7 ± 1.2 *
Control	40	3.2 ± 1.8
Crude garlic	70	4 ± 1.5
Warmed garlic	80	4.8 ± 1.6
Aged garlic extract	90	6.5 ± 1.3

*Values are means \pm SE

Table 2:Activity of garlic preparations on alcohol toxicity

Groups	Survival ratio %	Survival Period (day)
Control	0	$*0.5 \pm 0.4$
Crude garlic	0	0.7 ± 0.2
Warmed garlic	30	1.8 ± 0.4
Aged garlic extract	70	3 ± 0.3

*Values are means \pm SE

Discussion:-

The activity of three garlic preparations in testicular function and alcohol intoxication were investigated in this study. The crude garlic was effective only in recovery in testicular function but had no effect on alcohol intoxication. The activity of heated garlic did not improve testicular function while the aged garlic extract was effective in two models.

The decline in sperm density and decrease in incidence of normal sperm formation among middle aged – men (Carlsen, 1999). Pajarinen et al., 1997 has been suggested that some alteration in testis induced by toxins, drugs and alcohol. The decrease in sperm density is related to sterility which is indicator for male sexual dysfunction. The use of warm water with short period which influenced not only sperm formation but also reduced mounting with estrus females, and overcome the long period of other models which were suggested by Gomes et al., 1973 and Amatayakul et al., 1971. The garlic extract was inhibited the reduction in the appearance and number of mounting due to significant improvement of peripheral circulation (Ushijima et al., 1997). It is possible that the aged garlic extract might enhance the supply of O₂ and stimulate energy metabolism in the testis.

Alcohol is a toxin that causes liver damage. It is metabolized by alcohol dehydrogenase to acetaldehyde which is taken part in alcohol toxicity. Acetaldehyde is under further metabolism by aldehyde dehydrogenase to acetic acid. Certain garlic preparations exhibit hepatoprotective activity against liver toxins. (Nakagawa et al., 1989, Sumioka et al., 1998). The enhancement of aldehyde dehydrogenase activity is one way to

avoid acetyldehyde toxicity.

The results were shown that the aged garlic extract was protected the mice with the possibility of enhancement of aldehyde dehydrogenase, but it is unclear to explain this mechanism and further studies are required for explanation.

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(تأثير بعض مستحضرات الثوم في السلوك الجنسي والتسمم بالكحول في الفئران)

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الخلاصة

أجريت هذه الدراسة لتقييم فعالية ثلاث مستحضرات للثوم وهي (الثوم الخام، الثوم المسخن الدافئ والثوم المعتق) في تحسين وظيفة الخصى بعد معاملتها بالماء الدافئ وفي التسمم بالكحول أظهرت النتائج ان للثوم الخام تأثير محدود في تحسين وظيفة الخصى فقط، في حين تضمنت فعالية الثوم المسخن الدافئ في تحسين وظيفة الخصى مع تأثير قليل في تحسين حالات التسمم بالكحول، أما فعالية خلاصة الثوم المعتق فقد كانت معنوية في وظيفة الخصى والتسمم بالكحول. يمكن ان نستنتج من النتائج أعلاه ان المستحضرات الثلاثة للثوم لها خصائص دوائية تختلف عن الأخرى في التأثير، وكانت خلاصة الثوم المعتق الأكثر تأثيراً في نموذجي التجربة.