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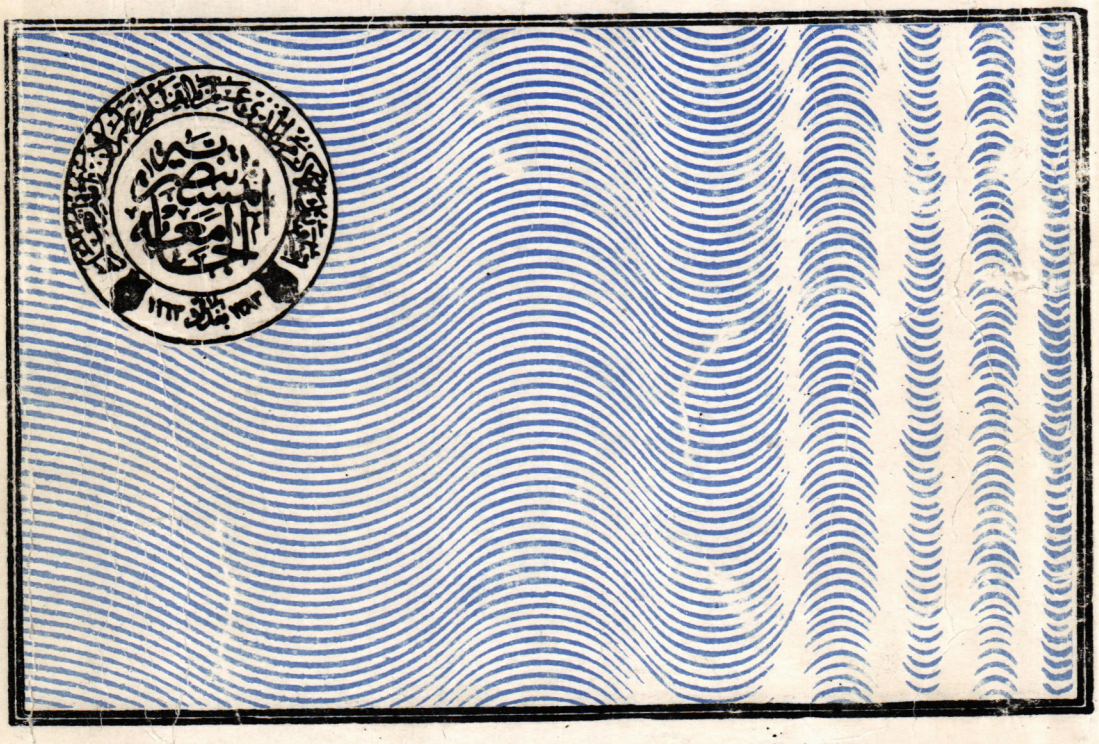

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CONTENTS

Effect of Heat on the Biological Potency of *Ephestia calidella* (Lepidoptera:Pyralidae) Exposed as Immature Stages

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(Recieved May 4,1992;Accepted Sept. 30;1992)

الخلاصة

ان التعريض المستمر للدور اليرقي الاخير من حشرة *Ephestia calidella* لدرجة حرارة ثابتة (35° م) انتج عقم جنسي للبالغات دون التاثير على قابليتها التزاوجية او اعمارها .لم يتم الحصول على اي فقس للبيوض عند تزاوج هذه الحشرات فيما بينها او تزاوج الذكور المعاملة مع اناث غير معاملة بينما لوحظ فقس قليل جدا في حالة تزاوج الاناث المعاملة مع الذكور الغير معاملة .تم الحصول على عقم جنسي عالي جدا عند تعريض عذارى كلا الجنسين بعمر صفر يوم لنفس الدرجة الحرارية وتزاوج البالغات فيمابينها او تزاوج الذكور المعاملة مع الاناث الغير معاملة .ان نسبة فقس البيض تصبح صفرا في حالة تعريض كلا الجنسين في الدور اليرقي الاخير لدرجة حرارة عالية مقدارها 40° م ولمدة 24 ساعة وتزاوج البالغات الناتجة فيما بينها علاوة على ذلك ,درجة عالية من العقم لوحظت في حالة تعريض الدور اليرقي الاخير للذكور انفس الدرجة الحرارية ولكن لمدة 20 ساعة . واخيرا تم الحصول على عقم جنسي كلي في ذكور حشرة *E. calidella* المعرضة لدرجة حرارة 40 ° م لمدة 20 او 24 ساعة كعذارى بعمر صفر يوم وتزاوجهما مع اناث معاملة او غير معاملة بنفس الدرجة الحرارية.

ABSTRACT

Continuous exposure of last instar larvae of *Ephestia calidella* (Gunee) to constant temperature (35°C) resulted in complete sterilization of the adult moths without affecting their mating ability and longevity .Non of the laid eggs hatched when the produced males where allowed to mate with either treated or untreated females, while few eggs hatched if treated females mated with untreated males. Different levels of sterility were also obtained when zero day pupae (males and females) were treated with 35°C.

Egg hatchability becomes zero if both sexes exposed at last instar larvae to 40°C for h and mated togethers. Furthermore ,high level of sterility was observed if males larvae exposed for 20 h, while slight differences in the egg hatched were noticed if females larvae treated only .On the other hand ,complete sterility could be occurred if adult males exposed to 40°C for either 20 or 24 h as zero day old pupae ,and mated with either treated or untreated females.

INTRODUCTION

Investigation was initiated in 1988 to determine the efficacy of using sexually sterile *Ephestia calidella* male and female moths in an program designed to control moth species that infest date fruits in store warehouses and fields.

The most important prerequisite for the success of such program is the development of a technique that can sterilize the insects without seriously affecting their biological activities, particularly, mating ability .Complete or partial sterility has been induced in one or both sexes of certain species of insect by administrating chemical substances in food (1), or by exposing them to gamma rays (2) or by subjecting them to abnormally high temperature (3-5) and by combination of temperature and gamma ray (6).Moreover, earlier study (3) suggested that continuous exposure of male pupae to incremental in temperature (30-37° C) had certain advantages and could positively contribute to the program of inducing sterility in *E.calidella*.Therefore , this report demonstrated the effect of certain selective sublethal high temperatures on male and female last instar larvae and pupae of *E.cali della* sterility.

MATERIALS AND METHODS

Last instarlarvae and zero day old pupae were obtained from stock culture reared under controlled condition (28+2° C,70+10% RH and 16 h light). Females and males (50 of each) as

larvae and pupae were acclimated to 35° C up to the end of pupal period while to 40C for various period of time (5,10,15,20 and 24 h).The treated larvae and pupae were individually kept in a glass vials (2.5 x 7 cm) closed with cotton pledge, they were removed to an optimum temperature of the rearing room or kept until adult emergence depending on the treatment period . On the other hand , last larval instar and pupae were kept under rearing conditions to be used as check. The exposure method was carried in an incubator in which temperature fluctuation was controlled to less than 0.5° C.

Adults emerged from each treatment were collected separately in the following mating combination were made :Normal female x normal male ; treated female x treated male; treated female x normal male and normal female x treated male. At least 20 replication of pair mating , were carried out for each mating combination for each treatment. mating was made into an eggs collection chimney like glass jar (3). All jars were kept under a constant temperature of 28±2° C.

Following biological parameters:pupal period;adult emergence;malformed adult; adult longevity;fecundity and fertility for each mating combination were evaluated. Data were analyzed by ANOVA and significant differences between means ($p<0.05$) were detected by Duncans multiple range test(7).

RESULTS

Effects of heat treatment on the pupal period , adult emergence and adult longevity.

Table (1) shows the results of investigation with last instar larvae and zero day old pupae held at 35° C until adult emerged ,these results indicated that pupal period and longevity of the female were significantly affected in comparison with the control while pupal period and longevity of the males were not affected. Furthermore, the results also showed that the percentage of adult emergence was not different from that of the control for both sexes,if last instar larvae treated,while there were significant differences in the percentage of only male emergences if zero day old pupae were treated . Meanwhile,the percentages of malformed adult for both sexes increased markedly if compared with their control.

On the other hand, results on the effect of different exposure to 40°C on the pupal period , adult emergence and adult longevity were shown in table(2) It was clearly seen from these results that pupal period and percentage of adult emergence for all treatment including the check were comparable for both stages treated while adult longevity was positively affected whatsoever the insect stages treated ,for example,exposing zero day old female pupae for 5 and 10 h to 40°C expanded their life span by about 33.6% and 25.8 %, respectively ,while exposing zero day old pupae for the same period of time
shortened their life span by about 33.8% and 7.1%,respectively.

Effect of heat treatments on the mating ability,fecundity and fertility:

Continuous exposure of last instar larvae and zero day old pupae of both sexes to 35° C resulted in decreasing mating ability of emerged adults as indicated in table(3). The reduction was 28.6%,35.7% and 14.3% if treated female mated with treated male ;treated female mated with normal male and normal female mated with treated male, respectively .Also,table (3) showed that fecundity of treated female (emerged from either last instar larvae or zero day old pupae)mated with treated or untreated male was significantly affected.Furthermore ,fecundity of normal female mated with treated male was also reduced by about 85% and 79% if male adult treated as last instar larvae or zero day old pupae, respectively. Such reduction in fecundity and also in eggs fertility ,reaching 100% sterility, was clearly demonstrated in case of treatment of both sexes.

Mating ability of adult moths that developed either from last instar larvae or zero day old pupae exposed to 40° C were illustrated in figures 1a and b.These results suggested that adult males developed from treated larvae and mated either with treated or untreated female were more affected , in spite of exposure time ,in comparison with adult males developed from treated pupa.Moreover,the effect was less pronounced in case of treated female for both stages .

Generally, there was clear reduction in the

Table 1. Effect of exposing *E. calidella* larvae and pupae to 35°C on ppupal period ,adult emergence,malformation and longevity.

Insect stages	X Pupal period * (day)		% adult emergence		% malformed adult		X adult longevity	
	Female	Male	Female	Male	Female	Male	Female	Male
Last instar larvae control	9.87a	9.53a	87	91	7	3	11.89a	6.79a
Treated	8.46b	9.50a	90	90	30	8	8.39b	7.05a
O-day-old pupae control	9.87a	9.53a	--	--	--	--	11.89a	7.03a
Treated	8.27b	9.44a	100	80	18	28	9.77b	7.03a

* Means in the same column (for each age used) followed by the same letter are not significantly different from the control (P>0.05,Duncan's multiple range test).

Table 2. Effect of exposing E.calidella larvae and pupae to 40°Cfor different period of time on pupal period, adult emergency, malformation and longevity.

Exzposure	X Pupal pperiod * (day)		% adult emergence		% adult malformation		X adult longevity*	
	Female	Male	Female	Male	Female	Male	Female	Male
Last instar larvae								
Check	8.47a	9.47a	95	90	--	--	10.95a	9.59a
5	9.19b	9.83a	95	95	0	0	9.47ab	9.42a
10	8.61a	9.62a	87	93	0	3	10.72a	8.65a
15	8.38a	9.56a	95	90	5	0	10.81a	6.72b
20	9.13b	9.45a	98	98	3	3	8.50b	8.40a
24	9.17b	9.51a	100	95	3	9	11.15a	8.40a
O-day--old pupae								
Check	8.47a	9.47a	--	--	--	--	10.95a	9.59a
5	8.50a	10.00a	95	90	5	6	14.62b	6.32c
10	8.05a	9.73a	100	98	2	3	13.77b	8.86b
15	9.83b	9.66a	89	97	3	8	10.29a	9.62a
20	9.52b	11.13b	97	91	0	3	11.32ab	8.40b
24	8.50a	10.03b	85	90	15	3	10.62a	7.97b

Table 3.. Mating ability , fecundity and fertility of *E. calidella* adults developed from last instar larvae or pupae exposed to 35 oC.

Mating type * FXM	% Mating ability	X + S.E. No. of eggs ?/ Female **	% Egg hatch **
Last instar larvae			
		Last instar larvae	
NXN	70	261.8±27.5a	58.2a
TXT	50	76.2±10.6c	0.0b
TXN	45	149.3±16.7b	13.3b
NXT	60	86.7±16.5c	0.0b
O-dat-old pupae			
NXN	--	261.8±27.5a	58.2a
TXT	50	158.7±20.9b	1.4c
TXN	45	196.7±15.8b	19.6b
NXT	63	54.6±13.3c	8.2bc

*N-normal; T-treated; F-female;M-male.

** Means in the same column (for each stage) followed by the same letter are not significantly different (P>0.05, Duncan's multiple range teast)

fecundity when either the male or the female member of a pair was exposed in both stages under investigation (Fig.2a and b). However, the reduction was usually more severe when both treated sexes mated together and to less extwith treated male only ,for example exposure of both sexes as last instar larvae or pupae for 24 h, had significantly greater effect on fecundity(F values were 9.1098 and 11.6459, respectively).

Exposure of either last instar larvae or pupae to 40° C for different periods of time had little or no effect on fertility especially when the treated stage was either female or male only .However,the effect was clearly demonstrated if exposed female mated with exposed male for both stages (Fig.3a and b) irrespective to the exposure time.

DISCUSSION

Although,continuous or partial exposure of larvae or pupae of *E.calidella* to sublethal high temperatures seems to affect almost all the biological parameters examined, mating ability was not seriously affected especially when adult emerged from stages treated with 40° C.Furthermore ,females emerging from larvae and pupae which were continuously exposed to 35° C or partially exposed to 40° C showed a large reduction in their fecundity which could explained as a result of destruction of the matured eggs, mainly primary and secondary oocyts in the ovaries (8-10).Such phenomenon was encountered when *E.calidella* was reared under natural condition of summer season (11).

Adults that developed from either larvae or pupae exposed to 35° C or 40° C showed a partial or complete sterility ,depending on the length of exposure and exact age of insect stage.Complete sterility was achieved by continuous exposure of both sexes to 35° C as larvae ,either mated together or as exposed male mated with normal female ,such results confirm other investigation (8,12) and support the hypothesis stating that developing male germ cell were more sensitive to high temperature than developing ova.However, the exact reason for sterility is unsolved,most result demonstrated that heat selectively interfere with production and motility of eupyrene sperm, furthermore, such sterility was also noticed when both sexes exposed to 40°C for 24 h as larvae or pupae and mated together .Partial sterility detected only when larvae or pupae exposed for specific period of time to both level of heating and either mated together or with opposite untreated sex.

In conclusion the result of this study suggest that heat treatment may be of some help as an additional approach to combat these pest and other related species.Further studies concentrated on a) finding physiological mechanism that responsible for achieving complete sterility in both sexes and b)mating competitiveness of treated insects are needed before large scale application.

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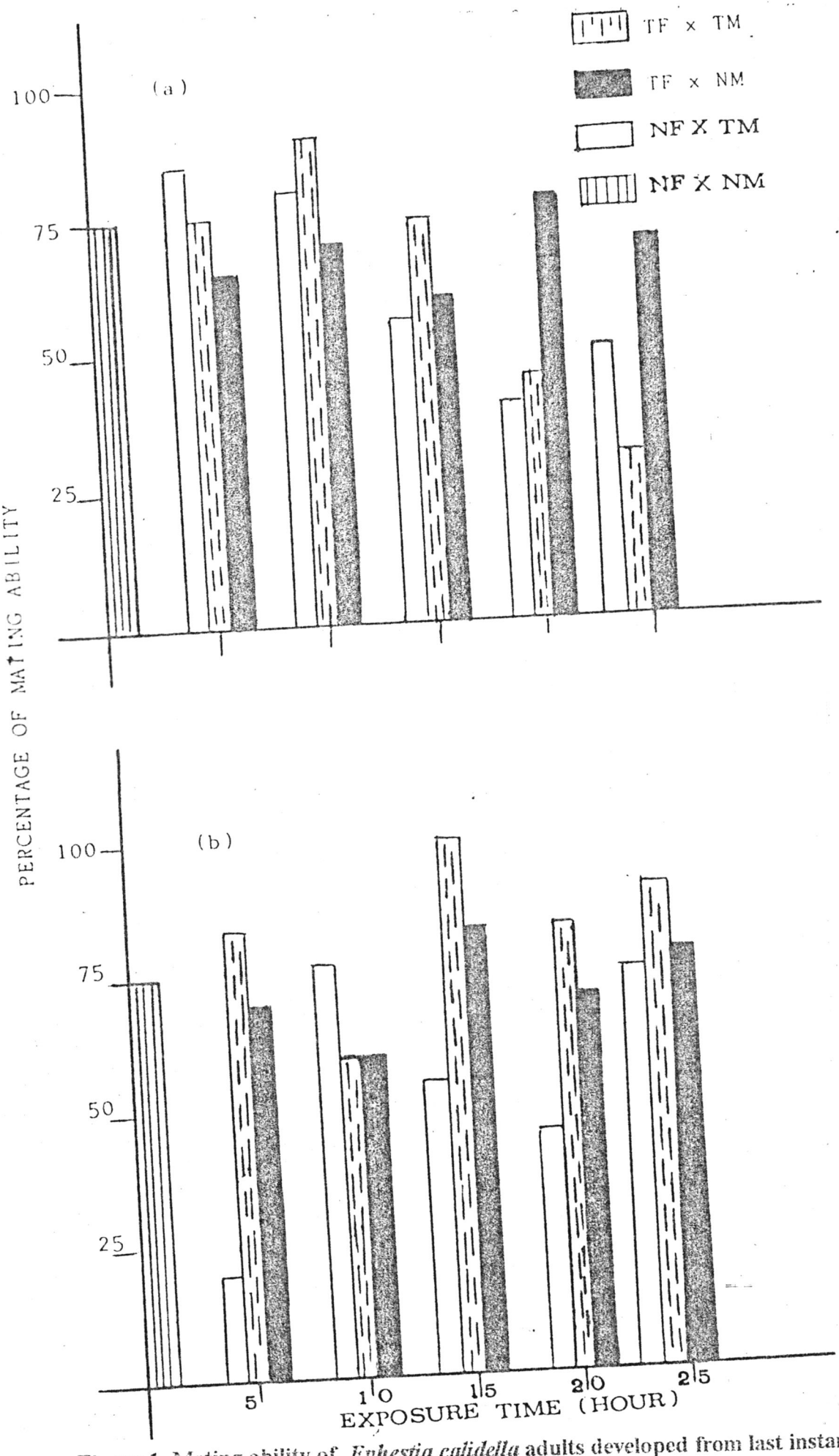

Figure 1. Mating ability of *Ephestia calidella* adults developed from last instar larvae (a) and zero-day-old pupae (b) exposed to 40°C for different period of time.

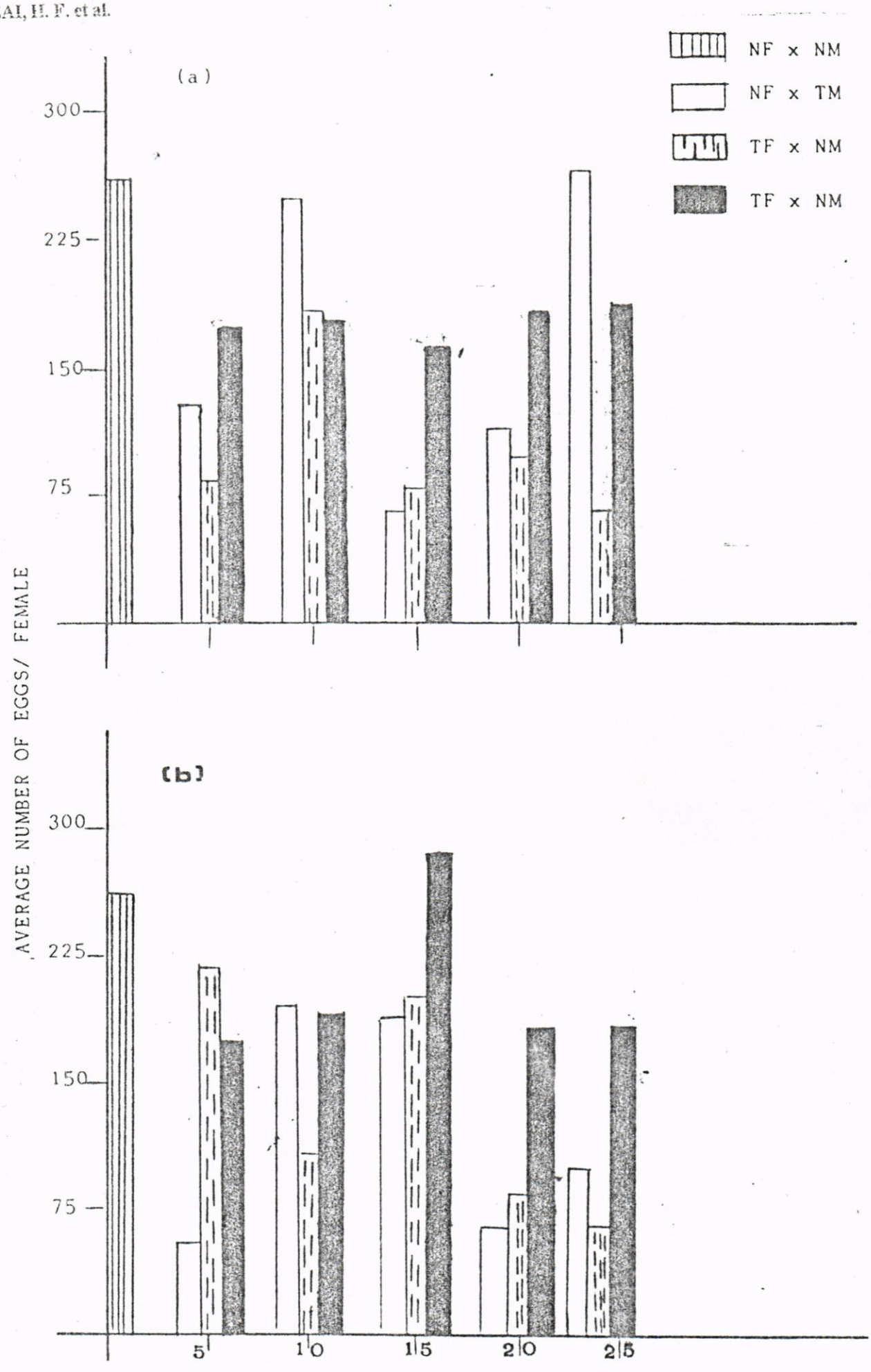

Figure 2. Fecundity of *Ephestia calidella* adults developed from last instar larvae (a) and zero-day-old pupae (b) exposed to 40°C for different period of time.

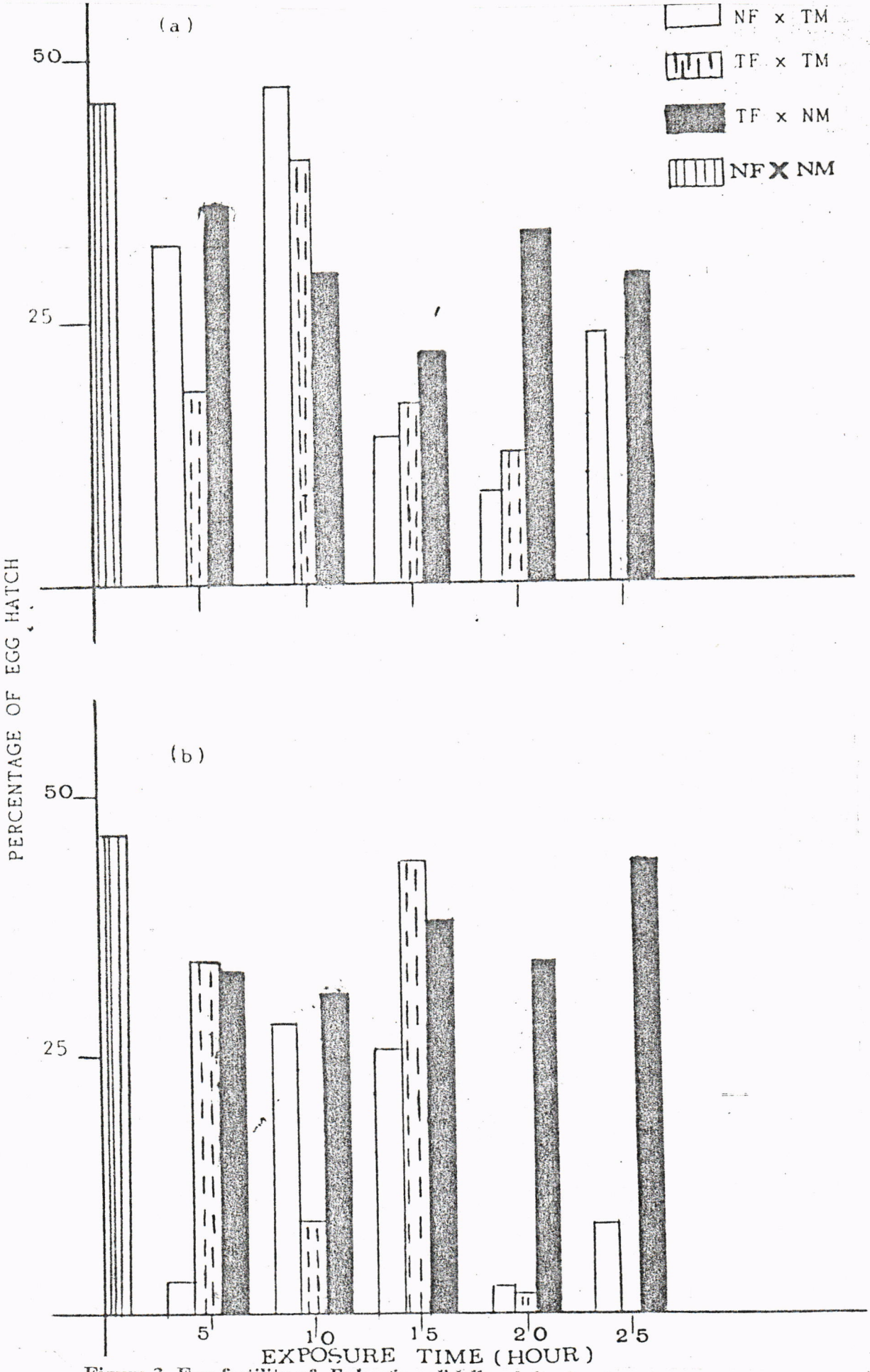

Figure 3. Egg fertility of *Ephestia calidella* adults developed from last instar larvae (a) and zero-day-old pupae (b) exposed to 40°C for different period of time.

Semi-Fully Stable Modules

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(Recieved Oct. 15, 1992; Accepted Dec. 19, 1992)

الخلاصة

قمنا في هذا البحث بتعميم مفهوم الموديلات تامة الاستقرار الى مفهوم الموديلات شبه تامة الاستقرار .قمنا بوصف الحلقات اغلارتينية من بين الحلقات صفرية الجذر الجاكوبي باستخدام الموديلات شبه تامة الاستقرار.

ABSTRACT

The notion of fully stable modules is generalized to that of semi-fully stable. Artirian rings among those with zero Jacobson radical are characterized using semi-full stability.

INTRODUCTION

Let R be a commutative ring with identity , and M be a (left) R-module. A submodule N of M is said to be stable if $\theta(N) \subseteq N$ for each $\theta \in Hom_R (N,M)$.In case each submodule of M is stable , M is called fully stable [1].The ring R is fully stable if the R-module R is fully stable.An R-module M is fully stable if and only if each cyclic submodule of M is stable,thus for each X in M and R-homomorphism $\theta : Rx \to M$, there exists an element t in R such that $\theta(y)=ty$ for each y in Rx [1]. Now for eachg r in R, define $\theta_r:M\to M$ by $\theta_r(m)=rm$ for each $m\in M$ .Clearly $\theta_r \in End_R (M)$, then $\theta(y)=ty=\theta_t .y$ for each y in Rx..

We introduce the following generalization of fully stable module based on the above motivation.

Dfinition (1.1):

An R-module M is said to bbe semi-fully sttable if for each cyclic submodule N of M and R-homomorphism $f:N\to M$,there exists $g\in End(M)$ such that $f(n)=g.n$ for each $n \in N$.

This is equivalent to saying that each R-homomorphism of a cyclic submodule of M into M is extendable to an R-endomorphism of M. The ring R is called semi-fully stable if it is a semi-fully stable R-module. It is to be noticed that semi-full stability coincides with full stability on rings.

Fully stable modules are then examples of semi-fully stable modules. In fact the concept of semi-fully stable modules is a proper generalization of fully stable modules.For example, every vector space Vof dimension n ($2 \le n<\infty$) over a field F is semi-fully stable, but not fully stable [1].

Let M be an R-module , and S(M) be the smallest stable submodule of the injective envelope E(M) containing M. S(M) is called the stable envelope of M. For more information about S(M) see [2].

Recall that an R-module M is said to be quasi-injective if each R-homomorphism of a submodule N of M into M is extendable to an R-endomorphism of M[8]. If M is an R-module which is not semi-fully stable,and S(M) is its stable envelope,then S(M)=Q(M) for any module M, where Q(M) is the quasi-injective envelope of M [2].ThusS(M) is semi-fully stable.Hence a submodule of a semi-fully stable module need not be semi-fully stable.The following rmark is easily checked.

Remark(1.2):

A stable submodule of a semi-fully stable module is semi-fully stable.

A submodule N of an R-module M is said to be closed if N has no proper essential extension in M. A complement for N in M is any submodule K of M which is maximal with respect to the proparty $N \cap K=(0)$ [7].

Proposition (1.3):

Let M be a semi-fully stable R-module, and N be a closed submodule of M. Then for any R-homomorphism α of a cyclic submodule K of M into N, there exists an R-homomorphism $\beta : M \to N$ such that $\alpha(x)= \beta.x$ for each x in K.

Proof: By Zorn's lemma we can assume that K is such that there is no R-homomorphism of T into N for any submodule T of M which contains K

properly with $\beta\,\alpha(t)=B.t$ for each t in K. Since M is semi-fully stable, then there exists $\beta\in End_R(M)$ such that $\alpha(x)=B.x$ for each $x\in K$. Suppose $\beta(M)\subseteq N$. Let L be the complement of N in M, then N is the complement of L in M, since $N\subset B(M)+M$, we see that $(B(M)+N)\cap L\neq(0)$. Let $x(\neq 0)=a+b\in(B(M)+N)\cap L$ where $a\in\beta(M)$, $b\in N$, the element $a\notin N$, otherwise $x=0$. Now $a=x-b\in L\oplus N$. Let $T=\{y\in M \mid \beta(y)\in L\oplus N\}$, T is a submodule of M containing K properly . Let be Π be the projection of $L\oplus N$ on N. Then $\Pi o\beta: T\to N$ and for each $x\in K$, $\Pi o\beta.x=\alpha.(x)$, which is a contradiction . Therefore $\beta(M)\subseteq N$.

The following corollary is an immediate consequence of proposition (1.3).

Corollary(1.4):

Every closed submodule (hence, any direct summend) of a semi-fully stable module is semi-fully stable.

In the following part we study semi-full stability of direct sums. Let M and N be R-modules, N is said to be almost M-injective if for each submodule L of M and R-homomorphism $f: L\to N$, there exists an R-homomorphism g:M $\to$ N such that $goi=f$ [4].Now, let M and N be R-module, we say that N is C-almost M-injective if for each cyclic submodule L of M and R-homomorphism $f: L\to N$, there exists an R-homomorphism g:M N such that $goi=f$ clearly. An R-module M is semi-fully stable if and only if M is C-almost M-injective R-module.

Theorem(1.5):

Let $M=\bigoplus_{i=1}^{n} Mi$ where each Mi is semi-fully stable R-module. If M_j is C-almost Mi-ifor each $i\neq j$, then M is a semi-fully stable R-module.

proof: Let N=Rm be a cyclic submodule of M, then we can write $m=(m_1,m_2,\ldots,m_n)$ where $m_i\in M_i$ $(i=1,2,\ldots,n)$. For any R-homomorphism $f: N\to M$, let f_{ji} be the composition of the restriction of f to Rm_i with the projection of Mi onto Mj then $f_{ji}: Rm_i\to M_j$.

Since for each $i=1,\ldots,n$, M_i is semi-fully stable, then there exist R-homomorphisms $g_{ji}\in End_R(M_i)$ such that $f_{ii}(x)=g_{ii}.x$ for each x in M_j. Also since for each $i\neq j$, M_j is C-almost M_i -injective,there exists R-homomorphisms $g_{ji}: M_i\to M_j$ such that $g_{ji}\,o\,x_i{}^3=f_{ij}$ where $\alpha_i{}^3$ is the inclusionmapping of Rm_i into M_i . Now put $g=\sum_{i,j=1}^{n}\alpha_j\,jo_{ji}\,\Pi o_i$ where α_j is the inclusion mapping of M_j into M then $g\in End_R(M)$. Hence

$$g.m=\left[\sum_{i,j=1}^{n}\alpha i o g_{ji} o\Pi_i\right](m)=\sum_{i,j=1}^{n}\alpha j o g_{ji} o\Pi_i(m)$$

$$=\sum_{i,j=1}^{n}\alpha j o(\Pi_i o f o\alpha i)o\Pi_i(m)=(\sum_{j=1}^{n}\alpha j o\Pi_j)o f o(\sum_{i=1}^{n}\alpha i o\Pi_i)(M)$$

$=I_M o f o I_M(m)=f(m)$. Hence M is semi-fully stable.

The above theorem yields the following corollary.

Corollary (1.6) :

Let N be a semi-fully stable R-module ,if $M=\bigoplus_{i=1}^{n} M_i$, where each $M_i=N$, then M is semi-fully stable.

Example (1.7):

For each prime number P,the Z-module Zp is semi-fully stable, and Q is also a semi-fully stable Z-module. Consider the Z-module $M=Q\oplus Zp$, Z is a cyclic submodule of M and $\theta: Z\to Zp$ the cononical epimorphism of Z onto Zp , then there is no Z-homomorphism $\Psi: Q\to Zp$ (hence, there is no Z-endomorphism of m) such that $\theta(x)=\Psi x$ for each x in Z[6]. Thus M is not semi-fully stable. In fact Zp is not C-almost Q-injective Z, hence the condition of theorem (1.5) is essential.

As we have mentioned before, every quasi-injective module is semi-fully stable. For the converse we have .

Theorem (1.8):

If M is a cyclic semi-fully stable R-module and M is C-almost S(M)-injective, then M is quasi-injective.

Proof: S(M)=Q(M) for any R-module M[2], hence S(M) is a semi-fully stable R-module. And S(M) is c-almostM-injective R-module, then by theorem (1.5), M⊕ S(M) is semi-fully stable .Consider the following injective mapping i_1:M $\rightarrow$S(M), i_2:S(M) $\rightarrow$ M ⊕ S(M) ,i_3:M$\rightarrow$M ⊕ S(M),I_M the identity mapping of M and the projection mapping Π:M ⊕S(M) $\rightarrow$M such that Πoia= I_M. Since M ⊕ S(M) is semi-fully stable, there exists an R-endomorphism β of M⊕S(M) such that i_3 (m)= β.m for each m in M, hence i_3= βo iz o i_1, therefore Πo i_3= Πoβizoi$_1$ thus I_M= Π oi$_2$oi$_1$. Now define α:S(M) $\rightarrow$ M by α= Πβo i_2 ,then I_M=αo i_1, thus M is isomorphic to a direct summed of S(M), but S(M) is quasi-injective [2]. Therefore M is a quasi-injective R-module.

The proof of the following proposition is essentialy the same as that of theorem (1.8).

Proposition (1.9):

If the direct sum of any two semi-fully stable R-modules is semi-fully stable, then every cyclic semi-fully stable R-module is quasi-injective.

Recall that a ring R is said to be qc-ring if every cyclic R-module is quasi-injective [3].In the following theorem we give a characterization of Artinian rings among semi-primitive (that is J(R)=0) rings.

Theorem (1.10) :

Let R be a semi-primitive ring. Then the following statements are equivalent :

1. R is Artinian

2- Every R-module is semi-fully stable.

3. Every cyclic R-module is semi-fully stable and the direct sum of any two semi-fully stable R-module is semi-fully stable.

Proof : (1) $\rightarrow$(2) since R is semi-primitive and R being Artinian , then R is semi-simple Artinian [3]. Hence every R-module is quasi-injective and hence semi-fully stable.

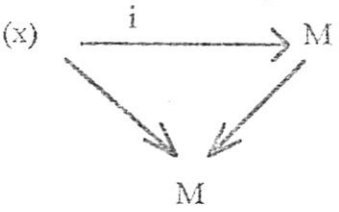
(2) $\rightarrow$(3) abvious .

(3) $\rightarrow$(1) since every cyclic R-module is semi-fully stable and the direct sum of any two semi-fully stable R-module is semi-fully stable, then by proposition (1.9) every cyclic R-module is quasi-injective , hence R is qc-ring, thus R/J(R) is Artinian ([3],theorem1), therefore R is Artinian.

Lemma (1.11):

Let M be an R-module and I any ideal of R. If M is a semi-fully stable R/I-module , then M is a semi-fully stable R-module. Conversely , if M is a semi-fully stable R-module such that I $\subseteq$ ann$_R$ (M) , then M is a semi-fully stable R/I-module.

Proof : The relation (r+I)m=rm for each r ∈ R and m ∈ M is used in each case to define M as a module over R (or R/I) where M is given as a module over R/I (or R). It is then easy to see that the concepts of submodule and homomorphism coicide over each ring. Hence any diagram.



Over one ring is also a diagram over the ring and thus M is semi-fully stable over R if and only if M is semi-fully stable over R/I.

Proposition (1.12):

Every module over an Artinian ring is semi-fully stable.

Proof: Let M be a module over the Atinian ring R. then R=R/J(R) is Artinian ring with J(R)=(0). By theorem (1.10) M is a semi-fully stable R-module, last lemma implies that M is a semi-fully stable R-module.

Recall that an-R-module M is said to be multiplication if each submodule of M is of the form IM for some ideal I of R[5]. An endomorphism f of a module M is diagonal endomorphism if for each x ∈M there exists an element r ∈R such that f(x)=rx (r depends on x).

Recently, Naoum in [10] proved that every endomorphism of a multiplication module is diagonal. Then we have

Corollary (1.13):

Every multiplication module over an Artinian ring is fully stable.

Proof: Let M be a multiplication module over the Artinian ring R. It is enough to show that each cyclic submodule of M is stable. Let N be a cyclic submodule of M and f:N$\rightarrow$ M an R-homomorphism of N into M. Proposition (1.12) implies that M is a semi-fully stable R-module, then there exists an R-endomorphism g of M such that f(x)=g.x each x ∈N. But M is

multiplication, then for each m $\in$M, there exists an element t$\in$ R such that g(m)=tm. Now for each x $\in$N, f(x)=g(x)=tx $\in$N, thus f(N) $\subseteq$N.

Recall that a ring R is self-injective if it is injective R-module, this is equivalent to saying that for each ideal I of R and R-homomorphism f: I $\rightarrow$R, there exists an element V $\in$R such that f(x)=vx for each x in I, thus R is a fully satble ring. It is known that, a homomorphic image of a self-injective ring need not be self-injective [9]. However Y. Utumi in [11] proved that if R is self-injective then R/J(R) is a self-injective ring. Also it is known that a homomorphic image of a fully stable ring may not be fully stable [1]. Then we have the following.

Theorem (1.14):

Let R be a fully stable ring with the property that R is a C-almost S(R)-injective, then R/J is a fully stable ring and it is a quasi-injective R-module.

Proof: R is a fully stable ring, this is equivaient to saying that R is a semi-fully stable R-module. On the other hand R being cycle (generated) by 1) , then by theorem (1.8), R is self-injective ring [11] hence R/J is self-injective ring. Thus R/J is a fully stable ring, and R/J is a quasi-injective R-module [3].

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The Effect of Ramadan Fasting on Immunoglobulins Level, and Leukocytes Counts

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الخلاصة

لمعرفة تاثير الصيام على مفردات المناعة الخلطية والخلوية تم قياس كلوبيلينات المصل المناعية والحمضات واللمفوسايت والخلالايا اللمفية المكونة للاوراد في 20 شخصا من الاصحاء الصائمين مع عينة سيطرة تالفت من 10 اشخاص غير صائمين وجمعت عينات الدم مرتين في اليوم لكل شخص في الساعة الثامنة صباحا والساعة الخامسة عصرا.من النتائج تبين ان هنالك زيادة ملحوظة في كمية الكلوبيولين المناعي ونقصان في الحمضات واللمفوسايت ولمفاويات المكونة للاوراد المتاخرة في مجموعة الصائمين في عينات الدم في الساعة الخامسة عصرا وزيادة ملحوظة في الخلايا اللمفية المكونة للاوراد المبكرة في الساعة الثامنة صباحا . كما يتوجب على الاطباء العاملين في البلاد الاسلامية الانتباه الى ان الصيام قد يؤثر على الكشوف المختبرية وخصوصا ما يتعلق بالخلايا اللمفية ايضا .

ABSTRACT

The effect of fasting the Islamic holy month of Ramadan on immunoglobulin level,leukocyte,eosinophil and lymphocyte were studied in twenty healthy normal fasting group and 10 healthy normal non-fasting individules (control).Blood samples wcollected twice a day (8 a.m. and 5 p.m).In the fasting group,a significant increase in IgG level,and a significant decrease in lymphocyte, osinophil,and total late T-lymphocyte was observed between samples collected at 5 p.m. compared with 8 a.m sample group. A significant increase in early or active T -lymphocytes in fasting group at 8 a.m. ompared with 5 p.m. In the non-fasting group,however no significant difference in any of the parameters studied was observed at 8 a.m and 5 p.m. A significant increase in early or active T-Lymphocytes at 8a.m. and a significant decrease in late T-lymphocytes at 5 p.m.was observed in fasting group compared with non-fasting group. These changes although unlikely to affect normal people may be significant in some patients.Physcians working in Muslim , countries should be aware that fasting of Ramadan may affect some immunological laboratory findings.

INTRODUCTION

During the holy month of Ramadan devout Moslems throughout the world abstain from food and drink from sunrise (4.00-4.30 a.m) to sunset (7.30-8.00 p.m).

The effect of food and water deprivation during Ramadan on blood and urine have been studied by many workers in Iraq (1-3).

As it is well known the immune system play an importan role in the defence mechanism against diseases.The opportunity was taken to study the effect of fasting on immunoglobulins level and leukocytes counts,so as to link changes seen which might be a predisposing factor of fasting that might affect humoral and cell-mediated immunity.

MATERIALS AND METHODS

This investigation was conducted in Ramadan,1411 after Hijra which corresponded to March 27 to April 25,1991.

Twenty healthy normal male (non-fasting) of comprable a ge and sex acted as a control.Those were chosen from students and staff members of the university of Mosal.In fasting group,blood samp le were collected during the fasting period;while in non-fasting group blood samples were collected after having their meals.Blood samples were collected

twice a day(8 a.m and 5 p.m.) from each individual.

A sample of 12-15 ml.of venous blood was collected each time 1which was then divided into three aliquotes.Half of milliliter of whole blood was used immediately for counting the total and differential white blood corpuscle. Five milliliter of blood was defribrinated and used for serparation and identification of T-Lymphocyte. The remaining blood was collected in a plain centrifuge tube which was left to clot for 2 hours at room temperature,centrifuged after contraction of the clot.The serum was pipetted into a tube and stored at 20 C until used for determination of immunoglobulin level.

The total white blood cell counts from each sample was calculated using the Neubeur Haemocytometer.Similarly the mean differential count was calculated from two blood film readings after staining with Leishman s stain using buffer solution (ph 6.8) for dilution and washing.At least200 leuckouytes were counted.

Serum immunoglobulin A G and M concentration was determined by single radial immunodiffusion(4) (Bio-Meriex,France immuno- kit). Yocob (5). Results expressed as unit/ml.

The techniqe used for defribrination, separation of peripheral blood , lymphocytes, identification and counting of T-Lymphocytes among peripheral blood was described in detail by Nahla(6). T-Lymphocytes among peripheral blood was determind by two procedures based on the capacity of human T-Lymphocytes to form rosettes with sheep red blood cells. The procedure used for the assay of the total population of T-lymphocyttes (late rosettes) was performed according to the method described by many authors (6-9).The second procedure which is recommended by many authors(7-11).for the detection of active or early T-Lymphocytes,no incubation step (at 4 C . overnight) was ,included.Only a small population of T-Lymphocytes was found to form rostettes.

All results were expressed as the mean ± S.d.and assessed statistically using the paired t-test.

RESULTS

Table 1. summarized the levels of immunoglobulines and total leuckocytes count measured at 8 a.m. and 5 p.m. in fasting group. A significant increase in immunoglobulin G eas observed at 5 p.m. if compared with 8 a.m. A significat decrease in the total lymphocyte, eosinopil,and late T-lymphocyte at 5. a.m. compared or active T-lymphocytes at 8 a.m. was observed in fasting group.

Table 1. Level of immunoglobulins and total leukocytes count measured , at 8 a.m.and 5p.m.in fasting group.

Parameters	8 a m (Mean ±S.D.)	5 p.m. (mean± S D.)	P-Values
Total lgA(IU/ml)	93.85 8±35.49	89.70 8±27.03	N.S.
Total lgG(U/ml)	105.95±22.65	116.05±27.47	<0.05
Total lgM(U/ml)	116.15 8±55.01	122.40±53.61	N.S.
Total leukocytes/mm ^{9}	6802.50±1082.99	6672.50 ±1235.16	N.S.
Total eosinophil/mm ^{3}	193.45±102.56	155.30 ±87.44	<0.05
Total lymphocyte/mm ^{3}	2426.12±201.21	1885.35±280.11	<0.05
Total early T-LY/mm ^{3}	492.35 ±181.94	266.85±94.95	<0.05
Total.late T-LY/mm ^{3}	1359.55±269.01	982.80±211.71	<0.05

IU/ml of lgA=0.0164mg/ml; U/ml of lgG=0.087mg/ml; U/ml of LgM=0.0087 mg/ml.

In the non-fasting group, no significantdifference in any of the parameters studied was observed at 8 a.m. and 5 p.m. as seen in table 2.

Table 2. Levels of immunoglobulins and total leukocytes count measured , at 8 a.m.and 5 a.m.in non-fasting group.

Parameters	8 a m (Mean ±S.D.)	5 p.m. (mean± S D.)	P-Values
Total lgA(IU/ml)	125.70±51.44	116.00±50.00	N.S.
Total lgG(U/ml)	124.20±29.98	111.70±29.58	N.S.
Total lgM(U/ml)	114.40±57.28	118.80±57.87	N.S.
Total leukocytes/mm ^{9}	7290.00±920.81	7130.00 ±964.16	N.S.
Total eosinophil/mm ^{3}	232.60±52.14	215.90 ±45.98	N.S.
Total lymphocyte/mm ^{3}	2457.21±310.21	2231.50±350.30	N.S.
Total early T-LY/mm ^{3}	271.90 ±133.82	245.60±68.04	N.S.
Total.late T-LY/mm ^{3}	1514.10±420.24	1526.40±410.35	N.S.

IU/ml of IgA=0.0164mg/ml;IU/ml of IgG=0.087mg/ml;IU/ml of IgM=0.0087

Table 3.show the results of immunoglobulin level and total leukocytes count in both fasting and non-fasting group.A signficant increase in total early or active T-Lymphocytes was observed in fasting group at 8 a.m.which return to normal level at 5 p.m.But a significant decrease in total late T-Lymphocytes in fasting group at 5 p. m. if compered with non--fasting group was obtained.

DISCUSSION

Evaluation of number and function of human Lymphocytes has proven to of considerable value in understanding the great variety of immune deficiency cases.

Many authors(12,13) have demonstrated a correlation between cancer curability and the total number of periphera lymphocytes.It is now generally accepted that 2 distinct classec of lymphocytes are present in different species including man bone marrow or bursal derived (B) cells and thymus derived (T) cells 14-16.B-lymphocytes mediate humoral immunity and T-lynphocytes are mainly responsible for cell-mediated immunity in the animal and man system.

B-lyphocyte carry immunoglobulins on their surface and they are precursors of plascells which sythesize the immunoglobulin classess (IgA,IgD IgG,IgE and IgM).

Evaluation of serum immunoglobulin used for assessment of humoral im munity,in healthy adults the total serum IgG account for 73% of immunoglobulins IgA account for 19%. ,while IgM accolint only 7% (17).

In the present study,a significant increase in IgG (which constitute the highest iprotein in serum) during fasting is relatively in agreement with previous work (3).They observed an increase in the total serum protein which was attributed to dehydration.

Eosinophils are circulating white blood cells that contains substances important in the pathogenesis of various allergic conditions as well as infestation with various parasites. Such sensitization can be associated with high number of circulating eosinophils (18). A significant decreases in the total eosinophils count was observed in fasting group at 5 p.m.compared with 8 a.m. These may attributed to prolong abstain from food and drink that may probabl cause of type I of hypersensitivity.This very interesting observation may be quite useful for those with allergic condition; in other words,fasting can be benificial in those cases.

Table 3. Levels of immunoglobulins and total leukocytes count measured , at 8 a.m.and 5 a.m.in fastting and non-fasting group.

Parameters	Fasting	Non-fasting	P-Value	Fasting	Non-fasting	P-Values
	8 a m (Mean ±S.D.)			5 p.m. (mean± S D.)		
Total lgA(IU/ml)	93.85±35.49	125.0±51.44	N.S	89.70±27.03	166.00±50.00	N.S
Total lgG(U/ml)	105.95±22.65	124.20±29.98	N.S	116.05±27.47	111.70±29.58	N.S
Total lgM(U/ml)	116.15±55.01	114.40±57.28	N.S	122.40±53.61	118.80±57.87	N.S
Total leukocytes/mm^3	6802.50±1082.99	7290.00±92081	N.S	6672.50±1235.16	7130.00±964.16	N.S
Total eosinophil/mm^3	193.45±102.56	232.60±52.14	N.S	155.30±87.44	215.90±45.98	N.S
Total lymphocyte/mm^3	2426.12±201.21	2457.21±310.21	N.S	1885.35±280.11	2231.50±350.00	N.S
Total early T-LY/mm^3	492.35±181.94	271.90±133.82	<0.05	266.85±9495	245.60±68.04	N.S
Total.late T-LY/mm^3	1359.55±269.01	514.10±420.24	N.S	982.80±211.71	1526.40±410.35	<0.05

IU/ml of IgA=0.0164mg/ml;IU/ml of IgG=0.087mg/ml;IU/ml of IgM=0.0087

EnumerationofT-a valuable for diagnosting madisease associated with impairment of cellular immunity.Wybran et at.(19) . Studied patients who lack cellular immunity as in the Nezelof syndrome and found that leukocyte,were completely lacking T-lymphocyte,and patients with Wiskott Aldrich syndrome with impairment of cellular immunity showed low number of T-lymphocyte .Certain population of T-lymphocytes from rosettes (7-11),While other T-lymphocytes rosettes only under special conditions and are called late rosettes(6-9).

Many authors (9,10,20,21), stated any disturbance in the value of early and late T-Lymphocyte due to some immunological defects.A significant increase in active T-Lymphocytes was observed in patients suffering from canser (10) and in patients suffering from be a sarcoptic scabie (5).

In the present study a significant decrease in the total late T-Lymphocytes observd in fasting group at 5 p. m. if compared with 8 a.m.. But early or active T-lymphocyte inreases significant at 8 a.m. if compared with 5 p.m. No clear explanation can be given but modified recirculation of T-Lymphocytes could be a factor,or having a large amount of meal taken with in a short period of time in fasting group might affent T-Lymphocytes subpopulation.

The changes we have show in thisstudy are slight,none of them reaching pathological proportions and since Ramadan occur once a year it would be unlikely to have any adverse effect in normal healthy subjects.The glorious Quran provides adequately for diseases.

Anybody who is unable to fast Ramadan because of disease is allowed to postpone his prescribed fasting dayes untill and when he is welling (Sura 2,Vers 184).

It is important for docters working in Muslim countries to realize that fasting in Ramadan might causes some changes in blood constituents (especially T-Lymphocytes) which is unlikely to affect normal healthy people but might affect people with defect in cell-mediated immunity.

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Specificty of Baits in Isolation Saprolegniaceae

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الخلاصة

استخدمت خمسة انواع من البذور (الدخن ,الحنطة, الذرة,عباد الشمس,العنب) كطعوم لدراسة مدى خصوصيتها في جذب الفطريات التابعة لعائلة السابروليكنسية وبطريقتي المصائد والطعوم. الفطريات التي عزلت بطريقة المصائد هي : A.klebsiana,Achlya americana,S. hypogynam Saprolegnia ferax,A.poerculata, Pythium sp., Dic tychus sp., S.sp . (asex). لم يلاحظ هناك اي خصوصية معينة بين الفطريات كما لوحظ ان اعلى نسبة من هذه الفطريات قد تم عزلها (3)حيث كانت اعلى نسبة للوكسجين المذاب 8و8 واقل درجة حرارة 17 م كما اثبتت تجربة المصائد ان احسن نمو قد تم الحصول عليه على بذور تلى ذلك بذور الذرة وباستخدام الفطريات التالية: Dic tychus sp. S.ferax, and A.americana وبطريقة الطعوم مختبريا ,اظهر لنا كل من الفطرين الاول والثاني نموا اكثر على كل من بذور الدخن والذرة مقارنة بالبذور الاخرى ,كما تمكن الفطر الثالث من النمو وبشكل جيد ايضا على هذه البذور ولكن بدرجة اقل من الاولين.

ABSTRACT

Five different seeds (Pennisetum spicatum,Triticum spp, Zea mays ,Helianthus anus,Cannabis sativa) were used of baits to isolate species of Saprolegniaceae by Trapping and Baiting techniques .The fungi isoloted by Tarpping technique were: Achlya americana ,A. klebsiana, A.operculata,A.polyandra,Saprolegnia ferax, S.hypogyna ,S.sp.(asex.),Dic tychus sp. pythium sp. no relative efficiency betwcen fungi and substrat was observed .However in baiting technique A. americana,S.ferax showed more growth on both Pennisetum spicatum and Zea compared with other seeds ,also Dic tychus grew well but to aless extent on these two baits.

INTRODUCTION

Aquatic funqi represent an important group of organism which play a major part in the ecosystem due to thier rule in the energy flow.

They also actively degrade different substrates submerged in water ,these substrates includes :leaves, fruits, twigs ...etc.

There are three main ways of isolating aquatic ,these are baiting , trapping and plating procedures(1).

Baiting techniques is used either by collecting of water samples and baiting it in the laboratory ,or by trapping ,that is suspending the baits in the feild (2).Different baits used in the fields which includs newspaper,cellophane,seeds,fruits(3),insects(4).

There is a relationship between the type of baits and the isolated species(5).

In Iraq the only teqnique used to isolate aquatic funqi were by collecting water samples and baiting them in the laboratory by Cannabis sativa(6,7,8,9,10).

The present investigation is an attempt to study the validity of trapping method and to find if there is any relationship between the type of the bait and organism isolated.

MATERIALS AND METHODS

I- Trapping (Feild);The following seeds were used as baits;-

Pennisetum spicatum,Triticum spp., Helianthus annus, Zea mays ,Cannabis sativa.

Ten boiled seeds of each of above were placed separetly in a cylindrical tin (7cm diameter,10cm hight)with fine holes ,attached to a weight and suspended with a rope in the river Tigris near Rashdia .Tins were removed from water after four days ,brought to the laboratory.The seeds are washed several times with sterile distilled water ,examind for growth under the microscope.The above procedure,as repeated six times at different times

Dissolved Oxygen and tempreture of water were recorded at time of sampling by portable oxygen meter Ysl model 51B.The PH of water was determined by PH-meter Orion model 221.The electric conductivity varied between 0.6-0.7E. Cas recorded by E,C meter .The petri dishes are incubated at 20+2°C for development of reproductive organs .Pure cultures are prepared by transfering a single hygha to corn meal agar (CMA).Identification was based on Seymour Jhonson and cocker(12,13,14).

II-Baiting (Laboratory):In order to emphasize the specificity of the bait to different funqi ,three boiled above seeds are placed in a petri dishes with 9ml of sterite distilled water ,a disc CMA containing hyphal tips of either Achlya americana, Saprolegnia ferax,or Dic tychus spp are brought in contact with the seeds ,and incubated at 20+2°C, five replicas of each type of seeds are prepared.

RESULTS AND DISCUSSION

Table (1) shows the temperatue, dissolved Oxygen .and PH of the site of sampling in Tigris River (near Rashidia) at time of sampling .

Table (2) shows the species isolated these were:Achlya americana, A.klebsiana, A. operculata, A.polyandra, Saprolegnia hypogjna, S.ferax,S.sp.(asex.),Dictychus sp. , Pythium sp.

It is obvious from above table that A.klebsiana and S.ferax are more abundant throughout the sampling period, followed by Dichtychus sp.and Pytim sp.,Asex then Saprolegnia however both A.americana and S.hypogena are also identified in all the samples .A.polyandra is isolated in afewer samples .A. operculata is of less occurence in the samples obtained.considering the different baitses used in traps, it is clear that pennisatum spicatum and Zea mays are the best baits ,table (2) moreover P.spicatum is recomended due to its small size which give less chance of contamination when compared with Zea mays which also cause turbidity of water.

It is also notable that the highest number of species are in sample no.3 (Table2), this might be due to the high oxygen content or to the low temperature (17).

Dick[15] pointed out that there is a relative efficincy of diffrenet types of baits but in our work no such relation.

To gain more information about the specific affinity between the substrates and orhanisms.(baiting) is carried out Americana ,S.ferax,and Dictychus sp. are selected to represent organisms isolated by (Trapping).

It is clear from Table (3) that both of A.americana and S.ferax grow heavily and almost to the same extent on both of P.spicatum and Z.mays ,less growth was obtaind on Triticum. and H.annus, Probably due to easier utilization of nutrients in the former than the laters, Dictychus show.less growth on P. spicatum and Z.mays ,but no growth on Triticum spp. and H.annus. this could be explained by the slower growth of this organism than others.

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Table 1.Records of Tempreture, PH. Dissolved Oxygen in Tigris River during sampling.

sample No.	Tempe-rature ^{0}C	Dissolved 02 ppm	PH
1	28	4.4	6.4
2	29	4.2	6.7
3	22	8.8	9.1
4	17	7.2	6.8
5	25	5.0	7.7
6	28	4.2	6.4

Table 2. Occurance of different Saprolegnia ceae members on seeds in the field

	P.spicatum	Triticum spp.	Z.mays	H.annus	C.sativa
	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
Achlya-mericana	+ - - + + + -	- - - + - -	- - + + - -	+ - + - + -	+ - - + - -
A.klebsiana	+ - - + - - +	+ - - + - -	+ - - + + + -	+ + + + + - -	+ - - + - - -
A.aperculata	- - + - - -	- - + - - -	- - + + - -	- - + - + -	- + + - - -
A.polyandra	+ - - + + - -	- - + + - -	- - + + - -	- - + - - -	- - + - + -
Saproloegnia (asex)	- - + + + + -	- - + + + + -	+ - - + + + -	- - + - + -	- - - + - -
S.ferax	+ - - + + - -	+ - - + + - -	+ - - + + + -	+ - - + - + -	+ + - - - -
S.Hypoghna	- - + - - + +	- - - + + +	- - + + + -	- - - + + -	- - - + - -
Dichtychus spp.	+ - - + - + -	+ - - + - + -	- - + - - +	+ - - + + + -	- - + - - -
Pythuim sp.	+ - - + - - +	+ + + - - -	- + + + - -	+ + + - - -	+ + - - - -

Table 3. The growth of Achlya americana ,Saprotegnia ferax,and Dichtychus spp. on different baits in the lab. at 20C after 2 days.

Genus	P. spicatum	Triticumpp.	Z.mays	H. annus	C. sativa
Achly americana	++,++,++	+,+,+	++,++,++	+.+.+	-.-.-
S.ferax	++,++,++	+,+,+	++,++,++	+,+,+	-,-,-
Dichtychus spp.	+,+,+	-,-,-	+,+,+	-,-,-	-,-,-

Heavy growth ++ , Good growth + , No. growth - , 3 replicas used

Effects of Hydration- Dehydration Pretreatment on Vigour and Viability of Rice Seed(*Oryza sativa* L.)

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الخلاصة

بينت الدراسة ان معاملة بذور الرز (الصنف عنبر 33)بالتنقيع -- التجفيف قد خفضت معنويا درجة فقدان الحيوية والقوة فيها تحت ظروف تسريع الشيخوخة.كان ذلك في البذور المخزونة وبعمر 12 شهرا .وقد رافق التاثيرات المحسنة لهذه المعاملة زيادة معنوية في فعالية انزيم البروتيز بعد مرحلة التنقيع وحفظ تقريبا نفس المستوى من الزيادة في الفعالية بعد مرحلة التجفيف . ان ذلك قد يعكس تاثير علاجيا لهذه المعاملة ,اي ان الاضرار التي يحدثها التعمير للمكونات الخلوية قد تصلح بفعل بفعل الانزيمات .من ناحيةاخرى ادت معاملة مماثلة لبذور حديثة بعمر شهرين الى حدوث تدهور فيها اذا ما قورنت بالبذور غير المعاملة.

ABSTRACT

Soaking -drying treatment of rice seeds (Oryzasativa L.ver.Amber33) significantly reduced the loss of vigour and viability under accelerated ageing conditions. The beneficial effects of this pretreatment were associated with significant increase in protease activity , which may reflect acurative effect.Thus, the age -induced damage to the cellular components could be nzymetically repaired .However,similar pretreatment of fresh, 2-month- old seed caused deleterious effect as compared to untreated seeds.

INTRODUCTION

It has been recognised that germination processes and seeding establishment could be enhanced by seed pretreatment (1). Partial seed soaking and subsequent drying back, has been shown to invigorate and improve the rates of germination and seeding emergence from seeds of a number of species(2,3,4). Hydration-dehdration treatments for controlling physiological deterioration of seeds is a relatively new concept.It has been reported that soaking -drying treament of stored seeds of anumber of crop plants greatly reduces age- induced seed deterioration (5).Other results assumed that presoaking and drying back of seeds might represent a tool for the improvement of thier viability and vigour in storage (6). However it has been observed that hydration-dehydration treatment is beneficial to the old seed but deterimental to the fresh seed (7).Therefore , the present investigation aimed to study the effectiveness of soaking -drying pretreatment on viability and vigour of fresh ,2-month-old rice seeds (*Oryza sativa* L.var.Amber33).

MATERIALS AND METHODS

Tow-month-old and 12-month-old seeds of rice (*Oryza sativa* L.var. Amber33) were obtained from seed Proccessing Factory in Ghamas. Najef Province. Both seed lots were stored in gunny bags under ambient conditions till treatment.

Soaking -drying treatment was accomplished following the procedure of Base and Pal(8).

Seed vigour was assessed by employing an accelerated ageing technique at 100% relative humidity and 40 C(7). Sub-samples were withdrawn at 10 days interval for a period of 30 days ,and tested for germination and seedling growth parameters.

Seed viability was assessed in germination test recommended by ISTA(9).Final germination percentage calculated on the basis of 4 replicates of 50 seeds each per treatment , was recorded 96 hr after sowing ,and 20 seedlings of treatment were used to measure shoot -root length .All germination and seedling growth data are averages of triplicate sets.

Batches of seeds were analysed ,before and after soaking ,and after drying back for protease activity(10) .

RESULTS

Germination percentages of both lots of rice seeds were not affected after soaking - drying teatment , and before subjecting them to accelerated ageing process.

Viability of 12-month-old seeds was consistently reduced with accelerated ageing

time (Fig. 1A). It is clear that these seeds had lost about 50% and 70% of their inital viability after 10 and 20 days of accelerated ageing ,respectively.However, subjecting these seeds to soaking -drying treatment before accelerated ageing caused significant improvement in their viability and vigour throughout the ageing process, as revealed by the significant increase in germination percentages at 10 days ($P<0.001$) and 20 days ($P<0.05$) of accelerated ageing .Ageing for 30 days showed very low levels of viability in both treated and untreated seeds.

On the contrary, the deterioration in germination percentages with ageing process was increased in both treated and untreated 2-month-old seeds (Fig.1B).In fact, at20 days interval of ageing ,soaked -dryied treated seeds showed significant ($P<0.001$) reduction in germination percentage as compared with untreated seeds.

In general ,soaking -drying pertreatment produced comparable significant positive effects in the shoot- root length of both rice seed lots throughout the accelerated ageing process (Fig. 2.).Moreover ,treatment of 12-month-old seeds produced significantly ($P<0.001$) greater shoot-root length than untreated seeds before accelerated ageing .This increase was also significant after 10 and 20 days of accelerated ageing ($P<0.05$, $P<0.001$.respectively). In2-month-old seeds, soaking -drying treatment caused significant increase in shoot-root length as compared to untreated seeds at 10 days ($P<0.001$) and 20 days ($P<0.05$) of accelerated ageing.

Protease activity of both rice seed lots are shown in table (1) soaking of 12-month -old seeds caused a significant increase in protease activity over the control .Most of this increased activity was retained after dehydration treatment .However , protease activity was only slightly increased over the control after soaking of 2-month-old seeds and was not retained after drying back of seeds.

Table 1. Effect of soaking and soaking -drying treatment on protease activity (enzyme unit/g) of 12-month-old and 2-month-old rice seeds.

Protease Activity					
Seed Age	Control	Soaked seeds	Relative increase	Soaked-dried seed	Relative increase
12-month-old	0.17	0.29	69.9	0.27	57.2
2-month-old	025	0.28	12.8	0.26	2.4

DISCUSSION

It is evident from the present result that soaking -drying treatment has an ameliorating effect upon the viability and vigour of old rice seeds (var,Amber33). However, this treatment has an injurious effect on fresh seeds . These result are in accordance with that reported by Basu and Pal(8), and could be attributed to the ultrastructural damage of the cellular membranes as a consequence of rapid water uptake (11). This phenomenon has been further supported by the conclusion of Basue and Pal(8) that the intact cellular membranes of the fresh seed offered greater resistance to the rapid entry of water into the cells of fully immersed seeds,hence suffered greater damage than the relativily leaky membranes of older seeds.

Our results support the view that the beneficial effects of soaking -drying treatment could be the result of repairing mechanisms operating during the first phase of presoaking ,which may compensate for a portion of the accumulated damage and restore the seed viability and vigour (6,12).Therefore ,the observed high protease activity in soaked 12-month- old seeds might reflect the importance of first repair prerequisted for the second phases characterised by DNA synthesis and subsequent cell division (i.e. germination). This first phase may be stopped by dehydration without causing embryo damage ,since the induced metabolic changes retained in seed upon drying (13). Berrie and Drennan (4) reported a similar trend of increased protease activity upon dration retention upon dehydration in oat seeds.However ,the lower degree of improvement in protease activity in fresh seeds might support the fact that the extend of repair mechanisms in usually relative to the initial degree of storage -induced damage to the seeds(14).

The present results are of significant value to the programme of improving the seed quality of important and most prominent Iraqi variety of rice ,Amber 33, since this treatment

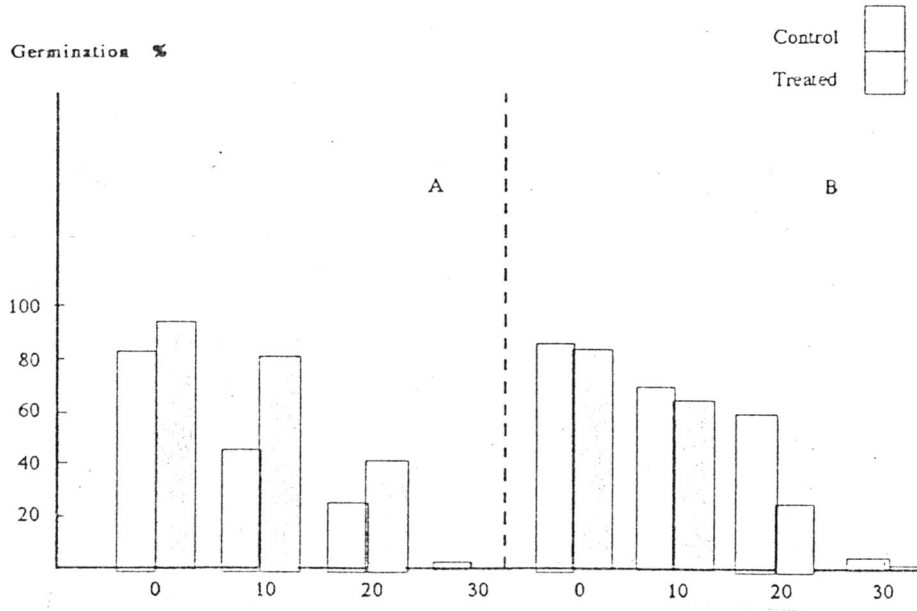

Figure 1. Effect of soaking-drying treatment on germinability of 12-month-old (A) and 2-month-old (B) rice seeds before & after accelerated ageing for various duration.

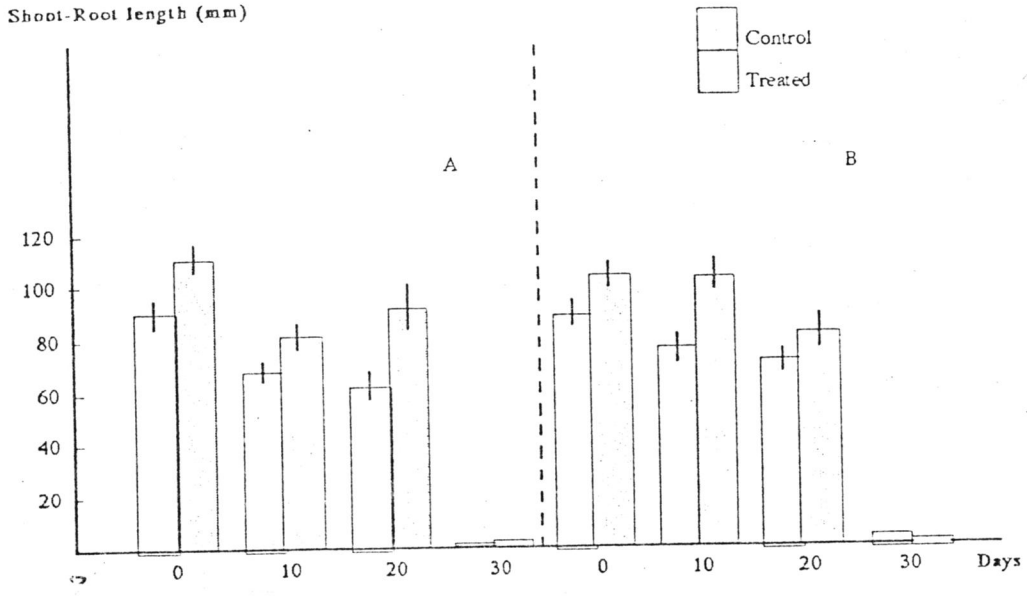

Figure 2. Effect of soaking-drying treatment on seedling growth of 12-month-old (A) and 2-month-old (B) rice seeds before & after accelerated ageing for various duration.

would be most profitable where the value of the seed is high.

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Antisera Medtated Antigenic Conversions in *Vibrio cholerae*

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الخلاصة

باستخدام الطريقة المبسطة لفحص التلازن على الشريحة الزجاجية وجد ان ضمات الكوليرا عترة الاوكاوا قد تحولت الى عترة العنابا بفعل االمصل الممنع الخاص بضمات الكوليرا عترة عنابا وليس بفعل المصل الممنع الخاص بضمات الكوليرا عترة اوكاوا.معاملة ضمات الكوليرا عترة عنابا بأي من المصل الممنع الخاص بكل من عترة اوكاوا او عترة عنابا لم تظهر اي تحول لاي نوع من ضمات الكوليرا.خلايا غير قابلة التلازن من ضمات الكوليرا نميت في وسط ببتون القاعدي وكذلك في وسط المرق المغذي الحاوي على المصول المضادة لكل من الكوليرا من ضمات الكوليرا اوكاوا أو عنابا وجد بأنها قد تغيرت الى ضمات الكوليرا القابلة للتلازن وذلك بفعل كل من المصل المضاد لاوكاوا والمضاد لعنابا في انظمة منفصلة.

ABSTRACT

Employing the simple slide agglutination test,it has been found that *V. cholerae* ogawa was choged to *V. cholerae* Inaba by the action of Inaba type- specific antiserum (heterologous) but not with the action of Ogawa type- specific antiserum.Treating Inaba with either Ogawa type-specific or Inaba type- specific an Tiserum revealed no conversion for any of the sero -types of *V.cholerae*. Cells of non aggulinable vibrios (NAG)grown in alkaline peptone water and a lso in nutriet broth media containing anti-Ogawa antiserum,anti-Inaba antiserum were found to change into an agglutinable forms by the action both anti-Ogawa or anti Inaba sera in separated systems.

INTRODUCTION

Species of *V. cholerae* are divided into several groups based on their O antigens types (1,2).

Strains belonging to 01 serog-roups have been further subdivided into three sertypes namely: Ogawa,Inaba and Hikojima.Serotypic changes in *V. cholerae* have been studied by several investigators during the past few years.(3) claimed to have accomplished the cnversion of an agglutinable cholerae vibrio into non agglutinable form.(4) and (5) were consistantly able to isolate Inaba mutant sero-types from Ogawa broth culture, grown in the presence of Ogawa-type specific antiserum but they were unable to demonstrate conversion of Inaba to Ogawa.

Conversions forom Ogawa to Inaba and from Inaba to Ogawa have been observed by others, using the slide aggutination test(6and7).

Since the antigen of Ogawa react with both the Ogawa and Inaba antiserum whereas that of Inaba reacts only with the homologous antiserum ,one may predict that the composition of the two could vary shightly are different, (8,9).

In contrast to the in vitro conversion noted previously, other investigators have observed reciprocal serotypic conversions in both directions in vivo,and those conversions have been observed regularly and were associated with the appearance of agglutinating antibody in serum,(6).

A heterogenous group of vibrios known as non-agglutinable vibrios(NAG vibrios) or non - cholera vibrios (NAV), chaterjee(10,11) These have been associated with diarrheal disease.

It has been indicated that the NAG vibrios shared flagerllar antigen with the true cholera vibrios and that they resemble cholera vibrios in many biochemical traits.An important point in the taxonomy of cholera vibrios or ganisms is the relationship between the classical and EL-Tor vibrios and non-cholera vibrios or the non-agglutinable (NAG)(12,13,7)

These NAG organisms are readily differentiated by means of slide agglutination test with anti-somatic antigen antisera from the vibrios which have historically been associated with the epidemic cholera .no shared antigenic delerminant was detected in NAG vibrios (14,15) and that the NAG cell showed no significant agglutination with any antisera.

It has been concluded that NAGs may change into an agglutinable form and cause disease during epidemics of cholera (16,14,15,8and9).

Table 1. Agglutination of V.cholerae treated with antisera.

Strain No.	Agglutination with anti-Ogawa	Agglutination with anti-Inaba	Control	
			anti-O	anti-I
M1	+	-	+	-
M2	+	-	+	-
M3	+	-	+	-
M4	+	-	+	-
M5	+	-	+	-
M6	+	-	+	-
M7	-c	+	+	-
M8	+	-	+	-
M9	-c	+	+	-
M10	-c	+	+	-
M11	-c	+	+	-
M12	-c	+	+	-
M13	+	-	+	-
M14	+	-	+	-
M15	-c	+	+	-
M16	+	-	+	-
M17	-c	+	+	-
M18	-c	+	+	-
M19	+	-	+	-
M20	+	-	+	-
M21	+	-	+	-
M22	+	-		-
M23	+	-		-

c=conversion
+=agglutination
-=no agglutination

Table 2. Agglutination of NAG vibrios treated with antisera.

Strain No.	Agglutinationwith anti-Ogawa	Agglutinationwith anti-Inaba	Control Anti-O	Anti-I
NAG18	+	+	-	-
NAG15	+	+	-	-
NAG*	+	-	-	-
NAG19	+	+	-	-
NAG144	+	+	-	-

MATERIALS AND METHODS

Strains of *V. cholerea* :stock cultures of 23 strains of v.cholerae which were previously isolated in AL-Yarmook bacteriology lab.were used in this study ,and designated as M1,M2.....thruogh M23,where as mrefers to AL-Mutansiriya University.

Non -agglutinating vibrios (NAG) were kindly supplied by the central health laboratory, Baghdad. MEDIA: Nutrient broth PH 7.4 and alkaline peptone water. pH 8.5 were used for cultivation of V.cholerae strains. Nutrient agar and alkaline peptone agar were used routinely for plating out the organisms prior to slide agglutination tests ,and were preprated by adding 1.5%agar to the liquid medium.Normal saline (0.85%)was used for emulsifying *V. cholerae* for the slide agglutination test.

ANTISERA:Difco 01 antisera included

V.cholerae antiserum Ogawa.

V.cholerae antiserum Inaba.

V.cholerae antiserum polyyalent.

Identification of the organism:

Identification of *V.cholerae* strains was based on the method used by (17 and 18).

Antisera treatment experiment:

Ten ml amount of broth media distributed in 25 ml test tubes were inoculated with a loopful from slant cultures of the *V.cholerae* organisms used in this work . Three sets of cultures were prepared each .time. For the first set each tube culture received a drop of undiluted anti-Ogawa serum.The second set received adrop of undiluted anti-Inaba serum .The third sit received no antisera and used as control .All tubes were incubated at 37 c for 18-24h.All the treated and control cultures were streaked on peptone agar and reincubated for 18-24 h at 37 c.Slide agglutination tests were performed as suggested by (19,20,21 and 7).

Test of stability:

All converted strains were subjected to at least five subcultures and their stability were checked again by the slide agglutination test.

RESULTS

The results of the vibrios cholerae strains which were treated with both homologous and heterologous antisera are presented in table(1).

The conversion of Ogawa serotypes to Inaba reported in this work were all from cultures treated with Inaba type-specific antiserum.

Detection of stability:

All converted strains were checked stability by subculturing them several times performed by picking a pure single colony which was transfered to afresh alkaline peptone water then streaked on alkaline peptone agar plates and incubated for 18-24 h at 370c or each subculture.

Results in table (2) show that the non-agglutinating vibrios treated with Ogawa type-specific antiserum or with Inaba type-specific antiserum could be agglutinated with both antisera.

NAG18 which is treated with both Ogawa and Inaba antisera showed a strong agglutination which is seen as asediment at the bottom of the test tube. The NAG vibrio in table (2) carrying no reference number which was treated with Inaba antiserum gave no growth on plating on alkaline peptone agar while the same strain thin treated with Ogawa antiserum and then plated out on alkaline peptone agar showed growth.

DISCUSSION

From the results reported it would appear that serotype . changes in *V.cholerae* is a stable phenomenon .(5and4) were consistently able to isolate Inaba mutant serotypes from Ogawa broth culture , grown in the presence of Ogawa type-specific antiserum .In this report *V.cholerae* Ogawa is converted to V.cholerae Inaba by the action of Inaba type - specific antiserum, i. e , in the presennce of heteologous and not with the homologous antiserum.

since the polysaccharide antigen responsible for the sero-logical activity of vibrio cells being in the surface of the vibrio (15) so aconversion from one serotype to another may indicate loss and synthesis of new antigenic factor.

Conversion of Ogawa to Inaba may indicate that the original strain lost antigenic factor B which is polysaccharide and synthesised the antigenic factor C which is Inaba type-specific. The role of antiserum in producing conversion is unclear but it may facilitate selection of mutant. Conversion of NAG to an agglutinable form indicates that NAG vibrios built the antigen, since the NAG vibrios lack. this antigen (15,16,17,and 9).This conversion may also demohstrate that mild infection with agglutinable strain stimulates certain level of antibodies. Reinfection with NAG vibrio may bring about conversion in -vivo and that may cause disease.

The changes in this organism which were fully confirmed in later years were antigenic variation from Ogawa to Inaba and from smooth to rough (5) which result from mutation (8) support the prediction that antisera is a mean, other than plasmid or phages,which may facilitate selection of mutants.

The observation from table (2)of NAG which showed no grwth when treated with Inaba antiserum may indicate that Inaba antiserum may contains vibriocial antibodies and can be explained on the basis of complement dependent effects according to vibriocidal antibodies of immune cholera sera found to be directed against the heat-stable component of *V. cholerae* (22) .The bactericidal activity of Inaba antiserum against the NAG vibrios presented in this report suggests that this statement is completely applicable since the antigens in the cytoplasmic and cytoplasm are being similar in the Ogawa, Inaba and NAG strains(9).

It has been indicated that there is a clear correlation between the complement - mediated serum vibriocidal activity of individuals and their resistance to the clinical disease (22), and that the vibriocidal antibodies are thought to be specific for the determinants of lipopoly-saccharides .

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Hypersensitivity to Mold Allergens in Mosul : 1-Correlation between Skin Test Reactivity and Percent Eosinophilia

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الخلاصة

تم قياس الاستجابة الجلدية للمستضدات العفنية في 182 شخص يعاني من الحساسية بضمنهم 132 شخصا يعاني من الحساسية للمستضدات العفنية. وجد ان نسبة الكريات البيضاء الحمضية في الدم المحيطي للذكور تساوي 8.8±4.9 وللاناث تساوي 8.1±5.3. اوضحت الدراسة وجود ترابط بين نسبة الكريات البيضاء الحمضية والاستجابة الجلدية للمستضدات العفنية . وهذا الترابط يبرز استخدام هذين العاملين لتشخيص الحساسية للعفنيات.

ABSTRACT

Skin test reactivity to mold allergens was determined in 182 atopic subjects,of these,132 subjects were hypersensitive to mold allergens.The mean of perigheral eosinophil percentage is 8.8± 4.9 for atopic males and 8.1±5.3 for atopic females.The study revealed a highly significant correlation between peripheral eosinophiles and skin test reactivity to mold allergens. The correlation may justify the use of these two parameters as an aid in the diagnosis of mold atopy.

INTRODUCTION

Many investigators called attention to the importance of fungi as the most common cause of respiratory allergy[1,2,5,7,9] .Fungal spores are present in the atmosphere in concentrations considerably higher than pollen grains.[11] Skin testing is the most convenient diagnostic of specific allergens in disease of type 1 hypersensitivity[4].Skin testing is used to determine specific immediate sensitivity in patients with atopic disease or cutaneous anaphylaxis[3,8] Prick testing or the scratch technique is preferable to the intracutaneous testing for its saftey due to minimal systemic absorption of allergens,Speed and little discomfort to patient particularly children[4].

A significant tendency for the percentage of eosinophiles to decrease with age was reported [5] The percentage of eosinophiles were significantly related to skin test reactivity and circulating IgE level [14] Eosinophilia much over 25% is not ordinarily seen in atopic disease ,but higher percentage suggests the presence of skin diseases of many types or parasitic infestation10.

MATERIALS AND METHODS

Subjects:

The study is carried out onatotal of 182 atopic patients refereed to us from the out-patient Clinic in Mosul General Hospital . Information regarding atopic history,age at onset, duration of disease ,occupation and season of the year affected are recorded. Patients proved to have parasitic infection are excluded as will be mentioned later under stool examination.

Skin Tests:

The skin tests are carried out by the Prick method12, using glycerin-preserved mold antigens from Pasteur Institute.A five percent solution of glycerin is used as control .All extracts used are of the same lot number and diluted to 1/1000.four sets of mold antigens are used:

1- Melange N1:contains antigenic mixture of: Penicillium, Aspergillus ,Alternaria ,Cladosporium.

2- Melange N2:Contains antigenic mixture of:Mucor,Rhizopus, Botrytis, Stemphlium.

3- Melange N3:Contains antigenic mixture of :Neurospora, Sitophila , Cheatomium, Pullularia,Fusarium.

4-Melange N4:contains antigenic mixture of: Helminthosporium, Trichothecium, Epicoccum.,Gyrophana, Lacrymans.

The test is carried on the volar surface of the forearm.the skin is cleaned with 70% alcohol and allowed to dry.Single drops of mold antigens are applied to the forearm.Adisposable sterile 26 gauge x1.25Cm needle is passed through the drop and inserted into the epidermis. Care is taken to avoid pricking deeply enough to cause bleeding .

The results of the test are read after 15-30 min.

For the purpose of this study, the reactions are used as follows: (-)=No wheal or erythema; (+)=No wheal;erythema less than 20mm in diameter; (++)=No wheal;erythema more than 20mm in diameter ; (+++)=Wheal and erythema.

Eosinophil Count :

Blood smears are made and stained with leishmnan"s stain.One-hundred leukocytes are counted and the percent of eosinophils is recorded.

Stool Examination:

Stool is collected in a clean, dry containers and examined within 1-4hrs, by direct smear.Fecal specimens are placed on clean slides,then emulsified with 0.85% saline or Iugol"s iodine .The slides are examined under 40x objectives for protozoan trophozoites and cysts; helminths eggs and larve . At least three specimens are examined for three consective days before negative results are reported Patients proved to have intestinal parasites were excluded.

RESULTS

For The purpose of this study;fungal atopy is defined as the presence of skin test reaction greater than the control to one or more of the four mold allergens applied. In this study (76) males and (56) females were shown to be skin test positive for mold allergens,while(31) males and (19)females were without skin test reaction,but had ahistory of atopy (asthma, hay fever,etc.)

Table(1) shows the skin test reactivity to mold allergens in relation to age and sex .In male subjects, 27.6 showed erythema less than 20 mm in diameter,60.5% showed erythema more than 20mm in diameter and 11.9% showed wheal with surrounding erythema. In female subjects,41.1% showed erythema less than 20mm in diameter.41.1% erythema more than 20 mm in diameter and 17.8% showed wheal with surrounding erythema.

Table (2) shows the distribution of peripheral eosinophilia in atopic subjects.It is evident that 49.5% showed peripheral eosinophilia higher than7 and only 13.7% showed peripheral eosinophilia in the range of (1-3).

Table(3) shows that in all age groups, nearly 60% of the subjects with positive skin test reactivity to mold allergens have a rang of eosinophilia higher than7.

Table(4) shows that the highest frequency of skin test reactivity in males 28.1% is obtained with Melang N 2 allergens. In females,the highest skin test reactivity 50% is obtained with Melange N 1 allergens.

Table(5) shows the fungi isolated from air at different localities in Mosul during spring season.

Fig. (1) shows a significant correlation between positive skin test reactivity and the mean% Eos.with t=2.318 above 0.200(t table=1.638).

DISCUSSION

Fungal spores are present in the atmosphere in concentration ,considerably in excess of pollen grains [11].Fungi considered to be the most common cause of respiratory allergy [6].

Fungi known as potential allergens in Iraq belongs to the genera: Mucor. ,Rhizopus. Syncephalastrum., Aspergillus., Penicillium., Fusarium.,Neurospora.,Alternaria.,Homodendrum.,Helminthosporium.,and Candida..

Little information is available regarding the allergenicity of fungal spores in Iraq[1,2,5,7,9].

Fungi isolated in this study are represented in the four skin test allergens used.The fungal isolated shown in table 5 are the most dominant fungal species in Mosul atmosphere, which confirm the proper use of the prick test using mold antigens from Pasture Institute as they are routinely used in Mosul General Hospital 32.4% of the subjects with mold atopy showed 4-6% eosinophilia while 49.5% showed > 7% eosinophilia. Our findings are in agreement with the findings of Felarea and Lowell [13] .The correlation between percentage of eosinophil and the skin test reactivity justifies the use of these two parameters in the diagnosis of mold atopy.

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Table 1. Skin test reactivity to mold allergens.

Sex	No.of subje-cts	Age mean + S.D	Skin test Reactiv-ity
Males	21	42.6 +8.6	+
	46	42.5 +15.2	++
	9	34.8+20.8	+++
Females	23	27.1+8.2	+
	23	25.9+11.0	++
	10	38.2+16.5	+++

+erythema less than 20 mm in diameter.
++ erythema more than 20 mm in diameter.
+++ wheal with surrounding erythema.

Table 2. Peripheral percentage of eosinophiles in atopic patients

Range of EOS	NO.of subjects		%		Cummulative%	
	atopic	normal*	atopic	normal	atopic	normal*
0	8	72	4.4	22.6	4.4	22.6
1-3	25	165	13.7	51.7	18.1	74.3
4-6	59	68	32.4	21.3	50.5	95.6
7+	90	14	49.5	4.4	100.0	100

*All data are statisticaly checked by using the "t" test at 0.05 level. They are found to be non significane t=0.75. t=0.00 respectively.

Table 3. Relationship between range of EOS and skin test reactivity

Age group	Range of EOS	% Skin test positive
1-25	0	3.3%
	1-3	9.3%
	4-6	13.2%
	7+	55.2%
26-45	0	22.7%
	1-3	16.3%
	4-6	18.8%
	7+	61.9%
46+	0	4.7%
	1-3	9.1%
	4-6	11.1%
	7+	66.0%

Table 4. Skin test reactivity to different mold allergens (M1.M2.M3.M4)

Mold	Sex	
allergen	males	females
M1	50(22.6%)	68(50 %)
M2	62(28.1%)	22(16.1%)
M3	37(16.7%)	17(5.2%)
M4	40(18.1%)	7(5.2%)

Table 5. Air born fungi isolated from different localities in Mosul during the spring season

Genus	% Isolation Localities	Colonies /ft ^{2}/ h
M1:		
Cladosporium.	58.8%	51
Alternaria.	52.9%	51
Penieillium.	100%	90
Aspergillus.	44.2%	39
M2:		
Rhizopus.	89.7%	75
Muoor.	87.0%	54
M3:		
Fusarium.	25.0%	30
M4:		
Helminthosporium.	48.1%	51
*:		
Aureobasidium.	19.1%	30
Paecilomyces.	1.9%	30
Candida.	1.5%	30
Syncephalastrum.	90.0%	81

*: Not present in allergens:so the reactivity is not due to these allergens.

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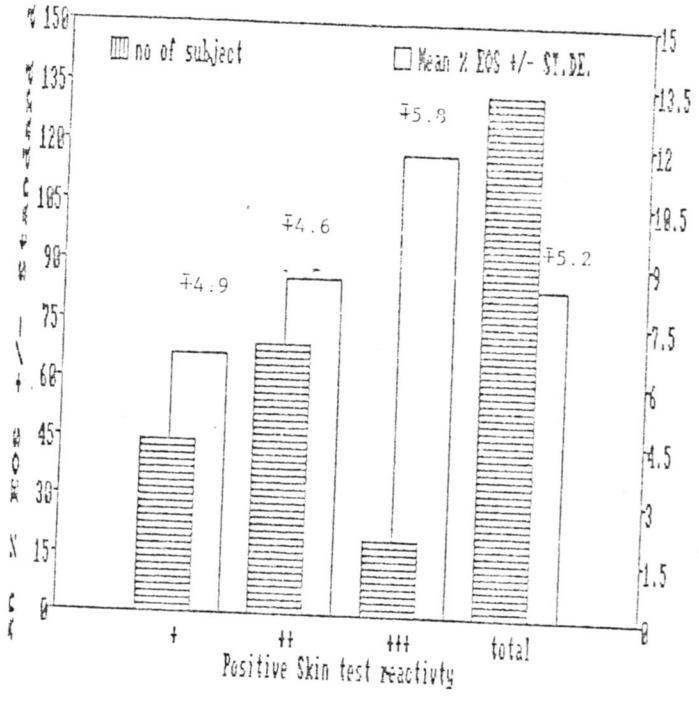

Figure 1. Relation between Skin test reactivity & %EOS .

+ erythema less than 20 mm in diameter.
++ erythema more than 20 mm in diameter.
+++ Wheal with surrounding erythema.

^{1}H - NMR Investigation of Some Dimeric (DI and Tripeptides)

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الخلاصة

اجريت التحويرات الكيميائية على البنية الجزيئية للببتيدات الثنائية والثلاثية وذلك بادخال الكنيل ثنائي الامين باستخدام الطرق الكلاسيكية لتكوين دايمرات ، املين بذلك زيادة ثباتية الببتيدات ضد التحلل الانزيمي. وتم تشخيص المركبات باستخدام الرنين النووي المغناطيسي (270 Mhz) .

ABSTRACT

The present study was undertaken to modify the dipeptide and tripeptide molecules by introducing alkylene diamine $(NH_2).(CH_2)_2$ at the C-terminal,in order to enhance the resistance towards enzymatic degradation.The resulting uncertainties about the chain length and complete structre assignment were resolved using (270 MH z 1)NMR techniques.

INTRODUCTION ,

Several features (1-3) indicate that Met-enkephalin (I) and Leu1enkephalin (II).could act as classic neurotransmitters and are r1apidly metabolized under the acti on of enkephalinase,when the C-te1rminal amino acid of enkephalin is removed.

The resulting dimers are potent and selective towards enzymatic degradations,and the binding capacity (4-5) with opiate receptors is enhanced.

Tyr-Gly-Gly-Phe-Met
(I)
Tyr-Gly-Gly-Phe-Len.
(II)

On this premise,we have characterzed the structure of two series of dimers using (270MHz) NMR techniques.The first series (A)[6],dimeric dipeptides (III)(DDn)=(H-GlyPhe)$_2$ 1-$(CH_2\ 1)$ 4n With n = 2,3,and 4,since the lengthening of the sequences by one (Tyr)resdue leads tothe dimeric tripeptide series (B) ;(IV)(DTR_n)=CH-Tyr-Gly-phe)$_2$.$(CH_2)_n$

H-Gly-phe-NH
|
$(CH_2)_n$
|
H-Gly-phe-NH
(III) $_n$ DD
Z-Gly-phe
(2 moles)

HBT / DCCI
(2moles)
(N-Z-Gly-phe-NH)$_2$. $(CH_2)_n$
HBR / glacial
acetic acid
(2moles)

H-Tyr-Gly.phe.NH
|
$(CH_2)_n$
|
H-Tyr-Gly.phe.NH
(IV) DTR $_n$
\+ NH_2 -$(CH_2)_n$ NH_2
one mole
(n=2,3,4)

$(Gly\text{-}phe\text{-}NH)_2 . ((CH_2)_n$ 2HBR

DD_n

Boc-Tyr | HBT / DCCT

(2moles) | (2moles)

$(N\text{-}Boc\text{-}Tyr\text{-}Gly\text{-}phe\text{-}NH)_2.(CH)_n$

TFA |

$(Tyr\text{-}Gly\text{-}phe\text{-}NH)_2.(CH)_n.2CF3\ COOH$

DTR_n

Figure 1. Structure and synthesis of dimeric dielectric and tripeptides.

EXPERIMENTAL

Peptides Synthesis:-

The reaction pathways corresponding to the synthesis by classical liquid phase techniques.The dipeptide acid (6) (Z-Gly-phe OH) was linked with diamino alkanes $(NH_2)_2$ $(CH_2)_n$(n=2,3 and 4) by (HBT / DCCI) method(6). After deprotection with Hbr in glacical acetic acid the resulting crosslink dipeptides $(DD)_n$ were coupled with Boc-Tyr by the same method(6).

Dimeric tripeptide analogs (DTR_n) were liberated by TFA* and purified by gel filtration on sephadex G-25 eluting with 30% acetic acid. Dimeric structure was proven on the basis of ^{1}H-NMR spectra.

*Footnote : The following abbreviation according to tyhe IUPAC-IUB commission have been used HBT, I-hydroxybenzatriazole; DCCI, N. N-dicyclohexyl carbodimide; Boc, tetbutyloxycarbonyl; Z-benzloxycarbonyl; TFA-trifluoro acetic acid.

RESULTS

Assignment of CONH$^{\alpha}$ CH-protons

There are recognizable as protons in which (1) are exchanged upon addition of DCCI but are still in slow exchange at 80 ^{o}C (ii) occur as doublets due to coupling to amino acid α-CH protons.

A comparison between Table (1) and (2) also shows the spectrum of (NH) for dimeric dielectric and tripeptides respectively . There are five such resonsnces between (8.25-8.35). giving the first direct ervidence for the previously postulated structure of amide group(NH).

Assignment of the "α-CH Region"(3-6) ppm:-

This region was anticipated to contain the five methine protons,attached to carbon also bonded to N which are postulated from chemical evidence.It also contains the five aromatic protons of phe and the four aromatic protons tyr. These are identified as the only protons in the (3-6) ppm region which have a single very small coupling (~1.5 Hz).

Assignment of the high field region (0-3) ppm

The assignment given in Table 1. & 2 are supported by double resonance experiments where applicable.

DISCUSSION

The ^{1}H n.m.r,spectra in table (1) indicated the correctness of the assigned structures .In general,the protons on C_α 1of (Gly) moiety of dimeric dipeptides (7) appear at the high field region was observed for (Gly) monomer This shift indicates the disappearance intra molecular hydrogen bonds.

The preliminary results confirm the hypothesis that an intramolecular hydrogen bond exists between the carbonyl group of (Gly) and (NH) group of the terminal amide.

Furthermore,the spectra of dimeric tripeptides un table (2) show a h igh field C_α of (Tyr) and Gly) respectively,and down field region for (Phe) while is an indication of conformationally rigid structure due to the spacer (ethylene diamine) .

It is of interest to note that the proton of (CONH) was the same for both monomer and dim ers(6). The terminal amine signl in the

(momomers) did not appear in the spectrum . This indicates that the protons might either be hidden under one of the aromatic moieties or they might be hydrogen bonded elsewher.

Finally,in correlating results of the present investigation for the dipeptide analogues and dimeric tripeptide analogues, a similar n. m.r.singal was obtained for both types of dimers.We have concented our discussion on the assignment of the n.m.r.parameter (chemical shift),relateed to our molecular structures.

The state of the art in n.m.r.spectroscopy generally allows an un equivalent assignment of the spectra.We hope that this will be realized in future n.m.r. work on such dimeric peptide molecules and that similar efforts will be made in obtaining these spectra in term of peptide conformation.

Table 1. Assignment of the ^1H NMR spectra of dimeric dipeptides (α)

	Gly		Phe					
	Cα	CONH	Cα	CβHB	CβHB	ph	CONH	(CH2)n
Monomer	3.6 (d,2H)	8.2 (S,1H)	4.0 (s,1H)	3.15 (dd.1H)	3.0 (dd,1H)	7.2 (m,5H)	---	---
Dimer (n) 2	3.25	8.2	3.85	3.4	2.8	7.3	8.25 (s,1H)	(1.25-1.45) (m.4H)
3	3.32	8.1	4.05	3.35	2.85	7.32	8.18 (s,1H)	(1.28-1.65) (m,6H)
4	3.33	8.2	4.05	3.35	2.8	7.32	8.28 (s,1H)	(1.26-1.85) (m.8H)

(a) :- Spectrum recorded for 0.1 M compouind in Me_2SO_4-d_6 at 30°C using TMS was added as internal standard.(b) :- s=singlet , d=doublet, dd=doublet, m=multiplet.

Table 2. Assignment of the ^1H NMR spectra of dimeric tripeptides.

	Monomer	Dimer (n)		
		n=2	n=3	n=4
Tyr/Cα	3.7(S,1H)	3.34	3.32	3.32
CβHb	2.7(dd,1H)	2.6	2.5	2.55
CβHa	3.09(dd,1H)	3.2	3.25	3.25
ph/3.5	6.68(d,2H)	6.92	6.9	6.9
ph/4.6	6.88(d,2H)	7.08	7.1	7.08
CONH	8.4(S,1H)	8.33	8.35	8.35
Gly/Cα	3.6(d,2H)	3.4	3.23	3.25
CONH	8.3(S,1H)	8.25	8.30	8.25
phe/C	4.0(s,1H)	5.52	5.32	5.28
CβHb	3.15(dd,1h)	3.52	3.35	3.35
CβHa	3.0(dd,1H)	3.4	3.35	3.35
ph	7.2(s,5H)	7.3	7.32	7.32
CONH	------	8.28(S,1H)	8.25	8.25
$(CH_2)_n$	-----	1.15-1.52(m,4H)	1.12-1.85(m,6H)	1.14-1.90(m,8H)

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Effect of Vitamin C on Serum Proteins in Alcoholic Patients

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الخلاصة

تمت دراسة تاثير فيتامين C على مستويات البروتينات في مصل الدم لاثنين وعشرين من مرضى الادمان الكحولي قسموا الى مجموعتين بصورة غير انتقائية . عند مقارنة مستويات البروتينات مع مثيلاتها لاشخاص اصحاء وجد بان مستويات البروتين الكلي والالبومين للمجموعة الاولى منخفض عما عليه لدى الاشخاص الاصحاء بينما في المجموعة الثانية لوحظ انخفاض مستويات الالبومين وارتفاع مستويات الكاما كلوبيولين. ان تناول فيتامين C لمدة عشرة ايام من قبل مرضى الادمان الكحولي ادى الى زيادة ملموسة في مستويات الفا 2 والبيتا كلوبيولين . تم الاستنتاج بان مستويات البروتين الكلي قد يتغير اعتمادا على مقدار تاثر الكبد بالكحول المتناول . وفي نفس الوقت ان تناول 1500 ملغم من فيتامين C من قبل مرضى الادمان الكحولي ادى الى زيادة ملموسة في مستويات الفا 2 والبيتا كلوبيولين.

ABSTRACT

The effects of high vitamin C supplementation on serum protein of twenty two alcoholic patients were studied.The patients were separted ,into two groups randomly.The measured parameters were compared with those of the control ;alcoholic patients of group 1 had significantly ,lower serum total protein and albumin levels,while in group 2 only albumin level was significantly decreased.The level of globulin fractions were increased in both group but changes was significant for group 2 only.Short-term supplemention of vitamin C 10 days to alcoholic patients (group 1) caused a considerable elevation in α_2 and β_2 globulin levels.We found that the measured values of serum total protein and their globulin fractions of alcoholic patients could vary depending on the severity of hepatic disorder caused by alcohol ingestion.At the same time supplementation of 1500 mg vitamin C daily caused a considerable increase in α_2 and β globulin levels of alcoholic patients.

INTRODICTION

Alcohol ingestion is associated with a variety, of secondary effects which can alter metabolic pathwways and cause a wide range of functional and structura disorders (1-4).The toxic effect of chronic an lcohol ingestion are reflected by biochemical abnormalities (4-8).a-1mony such biochemical abnormalities is the disturbances of plasmats of protein concentration.(7) Many attempts were made to reduce the side effect of alcohol ingestion (1,5).Our purpose in this stu dy was to investigate the effect , of high Vitamin C supplementatio on serum proteins in alcoholic patients Since no similar study has been done as we know.

MATERIALS AND METHODS

Twenty -two male alcoholic patien of different ages were studied. All had been admitted to Ibn Rushid hospital for alcoholism treatment. Patients were divided into two groups.Group 1,Patients supplemented with 1500 mg vitamin C daily (500mg three times a day) for10 days.Group 2 patients with no supplement of vitamin C for the same period of time. Separation between levels the two groups were made randomly Blood samples were taken on the flirst and 10th days of

admission,blood samples of ten normal volunteers also were taken to serve as control .

Serum total protein was measurd by the mean of biurate methods(9).Serum albumin,$\alpha 1$, α_2, β and γ globulins were measured by standard paper electrophoresis(9).

Statistics: Two samples test and analysis of variance were used to assess group differences (10).

RESULTS

Since the two alcoholic groups we divided randomly the values serum total protein and their glo,bulin fractions were compared with those of the control (Table 1.) . Alcoholic patients of group 1 had significantly lower serum total protein and albumin levels as compard to the control ($P<0.02$ and $P<0.001$ respectiovely). While in gdroup 2 the significant reduction was only in the albumin level ($p <0.05$). the level of γ globulin fraction were higher than that of controls in both groups, but the difference was significant for group 2 only. No significant variation from control were found for measured values of $\alpha 1$, α_2, β globulin fractions.

Results that obtained after 10 days supplementation of 1500mg vitamin C to alcoholic patients are shown in (Table 2.). Serum total protein and albumin levels were only slightly increased (3.5% and 5.7% respectively) and this reflected by a considerable elevation in $\alpha 2$ and β globulin levels($P<0.1$) while other globulin fractions of this group (α_1, and γ) were only slightly changed . While in alcoholic patients not supplemented with vitamin C for 10 days, group 2 , all measured components were slightly changed.

DISCUSSION

It could be concluded from the result presented here,that the measurd parameters of unselected alcoholic pateints can vary and may depend on the severity in hepatic disease caused by alcohol ingestion. The patients of the two groups , used in the study were of chronic; alcoholics, statistical comparison of the measured values with that ,of control revealed that both groups are having lower serum total , protein than the control ,but the defference was only significant for the patients of group 1 ,but both groups had significantly lower albumin.Another variation between the two alcoholic group was , also noted in the value of globulin fraction. Both values were elevated as compared to the control but the difference was significant only for group 2. The unexpected elevation of α_2 and β globulin fractions of group 1 after 10 days supplemention of 1500 mg vitamin C is of considerable interest,inspite of the fact , that $p<0.1$ which could be due to the short-term implication of vitamin C.

In alcoholic patients with liver cirrhosis,a reduced concentration of serum proteins, including album ins ,transferin (7) and increased α_2 macroglobulin (7,12),cerulplasmin (7) and immunoglobulin (8) were found.

In our previous study (14) the implication of such high dose of vitamin C which is 25 times higher than the recomended daily allowence of vitamin C(11) to alcoholic patients for 10 days helpe in reversing some of the disturbances and damage caused by chronic alchol ingestion as indicated by a rapid fall in the activity of certain enzymes.

Athough the diagnostic value of conventional serum electrophoresis provide rather limited information ,since each of the globulin peak include many different proteins (7)but the increase in α_2 and β globulin fraction found in the present study provide ratrher a new information for further investigation to the relationship between long-term supplementation of vitamin C and the proteins α_2 and β globulin fractions in selected accoholic patients.

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Table 1. : Comparison between serum total proteins and their globulin ,fractions of normal volunteers and the two alcoholic groups studied.

Parameter g / 100 ml	Control	Group 1	Group 2	P value
Total protein	a 7.54 8±0.43	b 6.87±-0.57	ab 7.26±0.43	<0.02
albumin	a 4.83 8±0.347	b 3.72 8± 0.49	b 3.68± 0.52	<0.001
α_1 globulin	a 0.37 8± 0.29	a 0.26 8± 0.1	a 0.22 8± 0.0	N.S
α_2 globulin	a 0.60 8±0.51	a 0.74 8± 0.23	a 0.71 8±- 0.19	N.S
βglobulin	a 0.85 8± 0.14	a 0.79 8± 0.19	a 0.98 8± 0.22	N.S
γglobulin	a 1.08 8± 0.34	ab 1.48 8± 0.29	b 1.63 8±0.49	<0.05

Data are expressed as mean ±S.D. Mean within the same raw are not followed by the same letter are significantly different.

Table 2. The effect of 10 days supplementation of 1500 mg vitamin C on serum total proteins and their globulin fractions in alcoholic patients.

Group	no of patients	parameter g/100ml	1St day of admission	10th
group 1				
alcoholics supplementd with 1500 mg Vitamin C for 10 days	13	T.protein	6.87 8- 0.57	7.12-0.51
		Albumin	3.62 - 0.49	3.8410.47
		α_1 globulin	0.26 -0.1	0.25 - 0.04
		α_2 globulin	0.74 -0.22	0.88 - 0.19
		β globulin	0.79 - 0.19	0.91 -0.16
		γ globulin	1.48-0.29	1.53 -0.32
group 2				
group 2 alcoholics supplementd with no Vitamin C for 10 days	9	T. protein	7.26 - 0.43	7.16-0.23
		Albumin	3.69 - 0.52	3.44 - 0.86
		$\alpha_1$globulin	0.22 - 0.79	1.24-0.07
		α_2 globulin	0.71 -0.19	0.77 - 0.26
		β globulin	0.98 -0.22	0.98 -0.22
		γ globulin	1.63 -49	1.74 0.61

*P<0.1

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Prevalance of Gastrointestinal Nematodes in Camels in Iraq.

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الخلاصة

من مجموع 281 عينة من براز الجمال التي تم فحصها كان 226(80.4%) خمجا بالديدان الاسطوانية وقد كان النمط السائد من الخمج هو الخمج المختلط (56.1%) وقد سجلت ثمانية انواع من الديدان الاسطوانية التي تخمج المعدة والامعاء كانت انواع الجنس *Trichostrongylus spp* و*Osterlagia* spp هي السائدة. الربيع هو فصل وفرة الديدان الاسطوانية التي تخمج المعدة والامعاء بنسبة (97.5%).

ABSTRACT

Out of 281 fecal samples of Camels examined, 226(80.4%) were infected with nematodes. The domenant type of infection was mixed one (56.1%) Eight species of gastro-intestinal nematodes were recorded. Trichostrongylus spp and Ostertagia spp were the predominante species.Spring was the season of the high prevalance (97.5%).

INTRODUCTION

Camels are present in Iraq as well as in some other Arab countries.The animals usually live in desert .Despite of the adyerse conditions of the desert , the camels still harbours adiyerse species of helmithes (1). The gastrointestina nematodes were considered to have the highest prevalance of all other helminthes infecting camels in Iraq(2).The aim,of the present work is to study some characterestics concerning certain nematode species parasitising gastrointestinal tract in camels.

MATERIALS AND METHODS

A total of 281 fecal samples were collected from camels slaughtered at Al-Najaf abattoir between June 1987 and May 1988.Fecal samples were collected in clean screw capped bottles containing 5% formalin and transferred to the College of Veterinary Medicine at Mosul for examination. Tey were subsequently examined by floatation method ,using saturated sugar solution(3). dditional samples were obtained for cultures without preservatiye.Facel culture was conducted according to (4.5),and third larval stage ,were collected by Baerman's technique and subsequently identified. Detection of eggs was accompanied the measurement of their dimentions using ocular micrometer.

RESULTS

It was found that 226(80.4%)of the fecal samples were positive for one or more species of gastrointestinal nematodes (Table 1.).The mixed infection (56.1%) was higher than the single type .Eight different species of nematodes were identified by both floatation or by fecal culture. The incidence of these species and their seasonal fluctuations are shown in(Table 2.).Frequency distribution of the 8 species revealed that the *Trichostrongylus spp* and *Ostertagia spp* were predominant.

DISCUSSION

The results of this study reveals the importance of the gastrointestinal nematodes in csels and it is similler to Altaif(1)in Iraq and (6) in Saudi Arabia.The high rate of infection with nematodes(80.4%) coincided with that of Alshamari(2).The predominant type of nematodes infection was the mixed one and was resamble(2) in Iraq and (6) in Saudia Arabia.

The present results showed a marked seasonal prevalance of infection in spring (97.5%) and the lowest infection was in summer (73.1%). These finding in agreement with the other workers in the regions having the same climatic naoure (2).These authers attribute the lugh prevalance of the nematode infection during spring may be to the spring rise phenomena,(2)in camels ,(7) in sheep ,and (8,9)in goats.

The eight species recorded in the present work were originally parasicis of sheep and this

was reported(10) as well as 7 other species.The predomenancy of Trichostrongyl spp in this study is similar to(1) in camels in Iraq and (11)in camels in egypt.The results reflects the natural resistance of these roundworms to adverse condition.The low prevalance of many other species of nematodes recorded in this study indicate their occasionall occurrance in camels(12).

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Tabel 1.Seasonal distribution and type of infection for gastrointestinal nematodes in camels.

		Type of infection					
Season	No.of samples	No. of posit.	%	single number	%	mixed number	%
Summer	93	68	73.1	29	44	39	55.8
Autumn	93	74	77.4	26	35	48	64.9
Winter	55	45	81.4	32	73.3	13	26.7
Spring	40	39	97.5	12	30.7	27	69.3
Total	281	226	80.4	99	43.8	127	56.1

Table 2.Frequency distribution of gastrointestinal nematodes in camels.

Species	Season	Summer		Autumn		Winter		Spring		Total	
	No.of samples	93		93		55		40		281	
		*	**	*	**	*	**	*	**	*	**
Trichostrongylus spp		45	18	50	13	20	15	23	2	138	48
Ostertagia spp		18	4	29	3	16	10	19	2	82	19
Haemonchus spp		20	1	19	2	6	1	5	0	50	4
Chabertia spp		10	3	14	6	2	2	4	0	30	11
Cooperia spp		5	1	3	0	2	2	5	1	15	4
Nematodires spp		3	0	10	2	4	1	25	6	42	9
Bunostomun spp		9	1	4	0	0	0	3	1	16	2
Oesophagosto-mum spp		4	1	5	0	4	1	3	0	16	2
Total		114	29	134	26	54	32	87	12	389	99

*Valus:represent the mixed infection , **Valus:represent the single infection

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Effect of Cigarette Smoking on Some Biochemical Parameters of Blood.

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الخلاصة

تم قياس مستويات كل من الكلوسترول والكليسيريدات الثلاثية والكلوكوز والالبومين والكرياتنين في مصل دم (109) مدخن و(23) رجل غير مدخن لاغراض المقارنة . كان معدل الكلوكوز عاليا في المدخنين عنه في غير المدخنين حيث بلغ الفرق المعنوي ($P<0.01$) بمستويين للتدخين (المعتدل وكثير التدخين) . وكان معدل اليوريا اوطأ من المدخنين مقارنة بغير المدخنين ($P<0.01$) فيما كانت الزيادة في الكليسيريدات الثلاثية معنوية احصائيا. اما معدلات قيم الكرياتنين والالبومين فكانت واطئة في المدخنين ، لكن مستويات الكلوسترول اعطت زيادة ثابتة مع عدم وجود فروق معنوية.

ABSTRACT

Serum levels of cholesterol,triglycerides,gluscose,albumin,urea and creatinine have been measured for (109) smoker subjects and (23) men non smoker control subjects.The mean value of glucose was \ higher in smokers than non smoker subjects with significant difference ($p < 0.0$) at two levels of smoking (moderate and heavy).The mean value of urea was lower in the smokers compared to nonsmoker subjects ($p < 0.01$). However,the increase in triglycerides was statistically significant.Values for creatinine and albumin were lower in the smokers , whereas , cholesterol levels showed a steady increase with no significance difference.

INTRODUCTION

Tobacco smoking has become a major public health hazard of modern times stimulating extensive social and medical arguments against habit (1). The causal link between cigarette smoking and number of diseases is now well documented (2).Cigarette smoking affects a very large number of persons in the community depending on the age and sex group,one may take 40-60 percent of the adults as a rough estimate (3).Tobacco smoke contains more than 300 (4),or about 500 (5) substances.The biologic activity of cigarette smoke has been investigated extensively,and the correlation of death rates with the number of cigarettes smoked has been well established for a number of countries (6).It is now generally accepted that cigarette smoking is detrimental to health (7).Smoking,through the action of nicotine, may affect severl laboratory tests.The extent of the effect is related to the number of cigarettes smoked and to the amount of smoke inhaled. The available information regarding the effect of cigarette smoking on the biochemical parameters in healthy subjects are relatively little compared to the huge informational background on the clinical effects of cigarette smoking (8).In many of the industrialized countries , cousumption of tobacco is decreasing and so is the incidence of related diseases(9).In developing countries, however, cigarette smoking is probably the single most important cause of noncommunicable disease,rapidly increase,especially in the youth(10).In this study ,an attempt has been made to investigatte some of the effects of cigarette smoking through the measurement of six different biochemical parameters.

MATERIALS AND METHODS

Six blood biochemical parameters were studied in (132) male lect1urer and student volunteers from the College of Science, University of Mosul.All the volunteers were healthy who have no overt pathologic changes. Non of the studied subjects admitted to be an alcohol drinker and (109) were having the habit of smoking for more than two years. range of all volunteers was (16- 51) years.,The number of

cigarettes consumed by smokers ranged from (4-50) with a mean of (18.4) cigarettes perday.The smoker volunteers were subdivided into three groups according to the number of cigarettes consumed per day depending on Gordon and Kannel (11):

1:Light smokers;1-10 cigarettes/day
2:Moderate smokers;11-20 cigarette day
3:Heavy smokers;over 20 cigarettes/day.

Results obtained were summarises in table (1) and the following tests were preformed on (5) ml of blood sample drawn from each subject : Serum cholesterol was determined by using reagents (12). Triglycerides by the method of Soloni (13) slightly modified by Giegel et.al,(14). Blood glucose was measured by the method of Nelson (15). Serum albumin determination was performed by the method of Peter et.al. (16). For the determination of urea,the method described by Chaney and Marbach (17) was used. Creatinine was estimated by using Jaffe reaction (18).All blood samples for those determinations were drawn in the mornig after a 12-hour fast.For statistical analysis of the data,studentT- test was performed to evaluate the significance of the difference between the meof any two samples (19).

RESULTS AND DISCUSSION

This study revealed that about 25.7 % of smoker subjects smoked 20 cigarettes or more a day compared to 32.2 % reported by Al-Dabbagh et al (20). Results obtained from the measurement of serum cholesterol revealed that the mean value of all smoker volunteers was higher than those of non smokers. Furthermore, within the increasing order of cigarettes smoking from light to heavy,each class was in turn higher than the other (i.e.heavy smokers higher than moderat and the latter higher than the light smokers).

However, statistical calculations showed no significant difference between different kinds of smoker against nonsmoker subjects. Al-Taweel (21) observed a significant higher increase in serum cholesterol among heavy smokers than light and moderate ones. Dales et.al.(8) found that smokers studied tended to have higher se rum cholesterol level than non smokers with a step-wise rise value with increasing amount smoked.The same authors postulated that the increase in serum cholesterol is mediated through threlease of catecholamines from the adrenal gland due to the effect of nicotine in cigarette smoke. The effect is presumed to be acting on adrenergic beta-receptors of adipose tissue cells to increase lipid mobilization resulting in a rise of serum cholesterol (epinephrine-like effect of nicotine). From these observations, an assumption can be made that the effect of smoking on serum cholestrol seems to be dose dependent. The implication of cholestrol in the development of atherosclerosis and heart disease is well documen. There is a statistically significant correlation between serum cholesterol levels and the incidence of coronary artery (22).

The importance of smoking seems to far more dominant than that of serum cholesterol and equals or exeeds that of serum triglycerides. It is of special intrest that the influence of smoking judged to have high cholestrol levels was significant.This indicates either that the combination of elevated cholesterol values and smoking especially damages the coronary arteries, or that hypercholesterolemia, proved by smoking, is more noxious than other forms of cholesterol elevation (23).Risk factors in coronary heart disease a leading cause of death in middle-aged men,have been defined as including high blood pressure. obesity,elevated serum cholestrol and cigarette smoking (24). Doyle and associates studies (25) demonstrates ahigher frequency of myocardial infarction with heavy cigarette consumption. The higher morality from coronary heart disease in cigarette smokers may be related to an increased myocardial oxygen demand caused by nicotine and a decreased myocardial oxygen supply produced by carboxy

Table 1. The mean values of all parameters in mg/100 ml (g/100 ml for albumin only).measured in the study.

Subjects (No.) parameters	Non smokers (23)	light smokers (37)	Moderate smokers (44)	Heavy smokers (28)	All smokers (109)
Cholestrol	186.83±30.40	190.75±33.60	194.86±34.80	200.65±37.60	194.95±36.30
Triglycerides	79.14±13.20	90.53±17.60	95.20±16.30	98.60±19.20	94.48±21.40
Glucose	92.56±12.50	98.57±16.10	103.18±14.90	106.25±20.40	102.40±18.70
ALbumin	4.18±0.76	4.03±0.69	4.07±0.56	3.94±0.44	4.02±0.71
Urea	23.62±3.90	22.20±3.20	20.95±4.00	20.52±3.40	21.26±3.70
Creatinine	0.89±0.9	0.86±0.14	0.83±0.15	0.80±0.21	0.83±0.18

Significant differences reported between each group of smoker subject with non smoker ones:

a =No significant difference
b =Significant difference ($P < 0.05$).
c =Significant difference ($P < 0.01$)
d =Significant difference ($P < 0.001$).

haemoglobin (26).Kannel (27) attributed the effect of smoking to the vasopressive effect of nicotine, "which triggers the lethal events in subjects with already existing coronary atherosclerosis either in clotting or in myocardial irritability "A higher rate of severe arterial damage was found in smokers than in nonsmokers".

However,a certain degree of covariation existed between smoking and serum cholesterol,the median cholesterol value for nonsmokers being 35 mg per 100 ml lower than smokers (23).The mean concentrations of triglycerides for all smoker volunteers were significantly higher than that of non smokers, and when smoker volunteers were subdivided according to the number of cigarettes consumed per day,the mean concentrations of triglycerides of all these subdivisions were also significantly higher than those of nonsmokers ($P < 0.01$ for light smokers,$P < 0.001$ for moderate and heavy smokers). Craig et.al, (28) reported that a significan dose response effect was present for cholesterol and triglycerides among non smokers and light, moderate and heavy smokers.These does response effects may provide new evidence for a causal relation between exposure to cigarette smoke and changes in serum lipid concentrations wether as a direct result of physiological changes or of dietary changinduced by smoki.

Furthermore,the does response effect of smoking on serum cholestrol concentration suggests a gradient of increased absolute risk of coronary artery disease between light and heavy smokers. Cholestrol and triglycerides appeared to be prominent in heavy smokers but not in medium smokers, in which only triglycerides increased significantly (29).Craig et al (30) found that smokers have significantly higher serum levels of triglycerides and lower serum levels of choleserol when compared with nonsmokers. The mean blood glucose concentrations for smoker volunteers (modrate and heavy groups) were significantly higher ($P < 0.01$) than that observed in non smokers,compared to higher mean value in thelight smokers,with no significant difference.Urberg et al (31) demonstrated that cigarette smoking is associated with increase in average blood glucose in smokers compared with non smokers,with the suggestion that elevated blood glucose may contribute to atherogenesis in cigarette smokers. Tomita eal (32) showed that there were no significant association between smoking and blood sugar.Results obtained from the determination of serum albumin indicated that there is no significant decrease as a consequence of cigarette smoking.yet it can be said thet cigarette smoking has no significant effect on serum albomin.However,Phillips et al (33) showed a decrease in serum albumin level with cigarette smoking and Larkin et al (34) found that smokers had significantly lower serum protein. As it can be seen from table (1).,all smoker subjects had significntly lower mean value of urea than those of non smoker subjects with the exception of light one with a steady decrease from light to heavy smokers.Cigarette smoking seemed to cause a slight gradual decrease (non significant) in serum creatinine mean value which is proportional to the number of ciugarettes smoked per day. Both, serum urea and creatinine concentrations tend to be less in smokers than those in non smokers(35).

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Synthesis and Spectroscopic Studies of some Substituted Coumarins

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الخلاصة

تم الحصول على الكيومارينات المعوضة بتسخين ميثوكسي مثيلين مالو نات ومشتقات الفينول تحت ظروف حامضية مختلفة (حامض مثيل السلفونيك او حا مض ثلاثي فلورو الخليك او حامض الفوسفوريك المتعدد.وقد تم اثبات التراكيب الكيميائية للمركبات المحضرة بالتحليل الدقيق للعناصر وبعض خواصها الطيفية.

ABSTRACT

Substituted coumarins were obtained when dimethyl methoxymethylene malonate and phenol derivatives were heated in the presence of various acids as methanesulfonic acid or trifluoroacetic acid or polyphosphoric acid. The chemical structures of these compounds were confirmed on the basis of their elemental analyses and some spectral data.

INTRODUCTION

Substituted coumarins are interesting group of compounds which have been found in many natural products displaying diverse biological activities. The range of compounds include untifungals [1], untico-agulants[2], and active against psori-asis [3], and carcinogens[4].

In recent years, different phosph-orus agents have been employed for inducing the reaction of o-hydroxybe-nzalde-hydes and carboxylic acids to give coumarin-3-carboxylates[5-7] Unfortunately, phosphorus agents are not always available and not simple to prepare. Now we describe a simple one step rout for the direct synthesis of some coumarin-3-carboxylates derivatives from the cyclocon-densation of dimethyl methoxymethylene malonate with some substituted phenols induced by various acids.

EXPERIMENTAL

General

All melting points were determined with a Kofler hotstage apparatus and are uncorrected. IR spectra (Nujol mulls) were obtained with a pye Unicam SP-2000 spectrophotometer and the ultra violet (U.V) spectra were recorded in methanol on Pye Unicam SP 8-200 spectroph-otometer. ^{1}H-NMR spectra were determ-ined on Brucker WH90 Ds spectrometer equipped with ASPECT 2000,32k computer, operating at 90 MHZ. Tetram-ethylsilane was used as an internal standard. Elemental analysis were carried out on CHN analyzer, type 1106 Carbo Erba.

2,3Dimethyl,3,4-dimethoxy,3-methoxy-,3,4-dimethyl-2,4-dimethyl,2,3,5-trimethyl phenols, are commercial products (BDH) and used as supplied .

Dimethyl methoxy methylene mal-onate was prepared by Fuson and et.al method[8].

General Procedure for the Preparation of Subsituted Coumarins (3a-f)

A ten fold excess of (methanesulfonic acid or trifluoroacetic acid or polyphospho-ric acid was added to a mixture of the app-ropriate phenol (1)(20 mmol) and dimethyl methoxy methylene malonate (20 mmol) at room temperature. The mixture was stirred and heated on a water bath at 90-100^o c for 1 hr., and then poured into a ice water . The solid was collected, washed with cold water and dried at 50^{o}c. recrystallization from ethanol furnished expected pure cou-marin-3-arboxylate(3) derivative (Table 1).

RESULTS AND DISCUSSION

There have been many synthetic routes to the coumarin derivatives[9-11], including the Perkin [12], Knoevenagel [13], Reformatsky[14], and Pechmann [15]. However, the pechmann reaction has been the most convenient applied method, since it proceeds from simple and readily available adducts. Thus the dimethyl methoxymethylene malonate(2)was reacted with phenol derivatives(1) using polyph-osphoric acid as condensing and

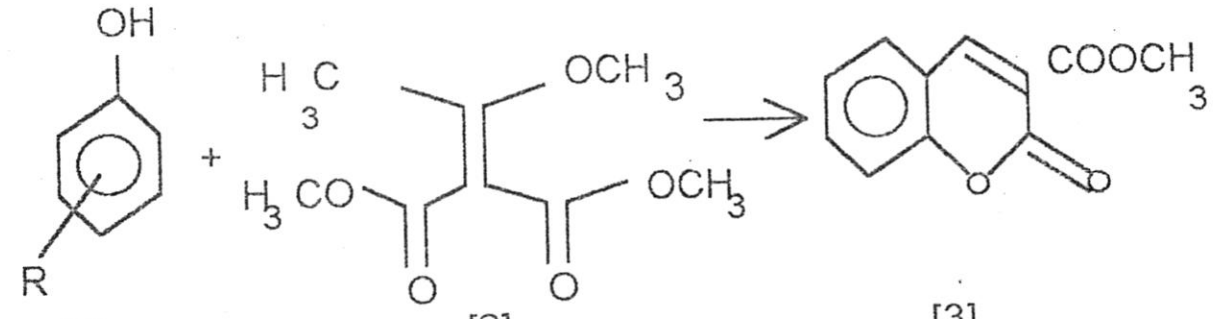
Table 1. Physical and analytical data of Compounds (3a-e).

Compound		Yield %		M.P °C	Analysis Calcd/Found %		IR-band (cm^{-1}) a	λmax (nm)b	^{1}H NMR(δ)c			
(3)	PPA	CF_3COOH	CH_3SO_3H		C	H			H-4 (s)	3-$COOCH_3$ (s)	Ar-H	CH3 (s)
a	90	82	75		61.54	4.27	1595,1680	245,352	8.40	3.86	7.55(2H)	-
				124-6	61.88	4.10	1735,1745			4.00d	7.0(1H)	-
											3.86	2)7.55H)
b	88	84	70	140-2	49.24	4.55	1595,1660	256,312	8.20	3.89d	6.95(1H)	-
					49.64	4.20	1730	375		3.95d	7.10(1H)	-
								15951680	352 245	8.40		
c	84	82	80	161-2	67.24	5.17	1610,1740	254,275	8.20	3.85	7.44(1H)	2.33
					67.88	5.35	1764	284			7.32(1H)	2.38
d	76	75	74	114-6	67.24	5.17	1595,1735	252,277	8.18	3.88	7.94(1H)	2.51
					67.20	4.70	1770	284			7.82(1H)	2.34
							4.55	1595 1660	312 256	8.20		
e	85	84	78	128-30	67.24	5.17	1595,1735	247,286	8.35	3.86	7.15-	2.54
					66.98	5.20	1745	320			7.56(2H)	2.40
							3.95d	7.10(1H)	-			
f	70	65	83	134-6	68.29	5.69	1595,1735	248.275	8.30	3.94	7.05(1H)	2.52
					68.00	5.92	1745	312				2.42

(a) only the characteristic absorption bands C=C,C=O were reported.
(b) Methanol was used as solvent.
(c) Deuteriochloroform was used as solvent.
(d) Corresponde to 7-OMe and 6,7-(OMe)2

cyclising agent to give methyl coumarin-3-carboxylate derivatives (3a-f)(scheme 1).Similarly, alternative acids, namely trifluoroacetic acid or methanesulfonic acid were used for the same purpose (Table 1).

Structural assignments of (3a-f) were achieved on the basis of their elemental analyses and spectral data (IR,UV,^{1}H-NMR).The IR spectral data of compounds (3a-e)showed two strong absorption bands in the region 1730-1745 cm^{-1} and 1595-1610 cm-1 correlated to ester carbonyl group and aromatic ring respectively ^{1}H-NMR data showed asinglet at 8.18-8.4 0which was integrated for one proton, assigned to H-4 proton.A singlet at 3.85-3.94,integrated for three protons, was assigned to methyl ester group at position 3. Furthermore , the presence of aromatic protons in the product was established by the signals at s 7.15-7.94.



[1] [2] [3]

(a);R=7-OCH_3 (b);R=6,7-$(OCH_3)_2$ (c);R=6,7-$(CH_3)_2$

(d);R=6,8-$(CH_3)_2$ (e);R=7,8-$(CH_3)_2$ (f);R=5,7,8-$(CH_3)_3$

(Scheme 1.)

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Thermal Grafting of Acrylamide onto Poly(Vinyl Mercaptan)

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الخلاصة

تم خلال البحث دراسة عملية تبرعم مونومرالاكريل امايد على بولي (فايئيل المركبتان) بدرجة 60 ° م بوجود فوق كبريتيد البوتاسيوم كباديء لعملية التبرعم في المحيط المائي . واستخدمت تقنيات مطيافية الاشعة تحت الحمراء ، التحليل الحراري الوزني والدراسات الوزنية لتشخيص البوليمر المتبرعم الناتج . لقد درست تاثيرات كل من تراكيز المنونومروالباديء وبولي(فاينيل مركبتان) وكذلك زمن التفاعل على ناتج عملية البلمرة (النسبة المئوية للتبرعم GP%) والتحويل الوزني (WC%) . تم وضع ميكانيكية لعملية تبرعم مرنومير الاكريل امايد على بولي (فاينيل المركبتان) وذلك من خلال عملية اقتناص ذرة الهيدروجين التابعة لمجموعة المركبتان (-SH) المتدلية من سلسلة البوليمر وذلك اما من قبل جذر الكبريتات السالب (SO_4^-) المتولد من التجزئة الحرارية للباديء او من قبل الجذر الحر النامي الناتج من ابتداء عملية البلمرة المتجانسة للاكريل امايد .

ABSTRACT

Thermal grafting of acrylamide onto poly(vinyl mercaptan) at 60°C in aqueous solution using potassium persulphate as initiator is described. Infra red spectra, thermal gravimetric and gravimetric studies of the product, after separation of homopolyr, confirm that grafting occurs. The effects of monemer, initiator ($K_2S_2O_8$), poly(vinyl mercaptan) (PVM) concentration and the reaction time on the yield of grafting (grafting percentage (GP%) and weight conversion (WC%)) were studied. The graftization mechanism was suggested. The process is exclusively occur by hydrogen abstraction reaction from the mercaptan group(-SH) in PVM by the either the primary radical anion(SO_4^-) or the homo polyacrylamide macroradicals produced through the direct initiaton of acrylamide monomer bt the persulphate initiator.

INTRODUCTION

Copolymers formed by grfting of vinyl monomers onto pre-existing polymer molecule have found many important applications in textiles, biotechnology, medicine, ion-exchange resins, material science ... etc. Many of these applications stem from changes in properties such as elasticity, stereoregularity, physical, mechanical, solvent adsorption and thermal behaviour resulting from grafting.

Various thermo, photo and radio chemical routes can be used to effect grafting process and these have been extensively reviewed in recent years[1-3]. One commonly used free-radical thermal initiator of vinyl polymerization in aqueous medium is the persulphate anion($S_2O_8^{-2}$)[3], which is beleived to produce sulphate radical anion(SO_4) on thermal homolysis [4]. This type of radical proved to be effective in initiation of graftization of vinyl monomer onto cellulose and cellulose derivatives by abstracting hydrogen atom that attched to a-carbon atomsrelative to hydroxyl group[3,5,6]. The radicals produced on the backbone of the polymer molecule can then add to vinyl monomer to produce the grafted aopolymer according to the following scheme:-

$$Cel\text{-}H + SO_4^{\cdot} \text{ -----> } (SO_4H)^- + Cel^{\cdot}$$

$$Cel^{\cdot} + CH_2 = CHX \text{ -------> } Cel\text{-}CH_2CHX \quad \text{..... (1)}$$

$$Cel\text{-}CH_2CHX + nCH_2 = CHX \text{ ------> } Cel\text{-}(CH_2CHX)_{n+1}$$

(grafted or crosslinked copolymer)

Where Cel-H is the cellulose or cellulose derivative molecule and
$CH_2 = CHX$ is the vinyl monomer.

Homovinyl polymer could also be produced through the direct initiation of vinyl polymerization by SO_4^- radicals[7], but this

could be minimized by an appropriate choice of reaction conditions.

Poly(vinyl mercaptan),(PVM), proved to be effective ion-exchange resin for sorption of copper and other heavy metal ion[8], through chelating process with these metal ions and pendant mercaptan groups. In an attempt to produce other derivative of poly(vinyl mercaptan), we intended in the present work to graft acrylamile monomer on poly(vinyl mercaptan) in aqueous solution. The grafted copolymer produced might have better hydrophilicity and other physico-chemical properties which are important in improving the efficiency of ion-exchange resins.

EXPERIMENTAL

Poly(vinyl mercaptan) was prepared according to the method described by Chanda et al. [8] Poly(vinyl alcohol (Fluka Ag,molecular weight 72000 g/mole) was partially converted to poly(vinyl mercaptan) in two stages. In the first stage the polymer was converted to a thiouronium salt by reacting with thiourea and hydrochloric acid, in the second stage, the thiouronium slat was hydrolyzed with sodium hydroxide and then acidified with sulphuric acid to yield the meracptan :

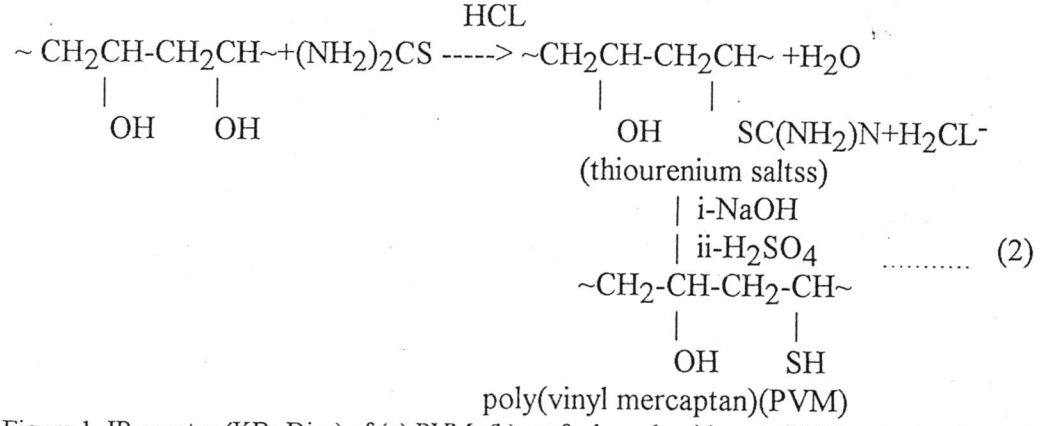

Figure 1. IR spectra (KBr Disc) of (a) PVM, (b) grafted acrylamide onto PVM and (c) polyacrylamide homopolymer.

According to this procedure, the -OH groups are partially converted to mercaptyl group(-SH) to give 2.23 meq/gm of free mercaptan content. The IR spectrum is effectively similar to that reported by Chanda et al.,[8] (see figure .1-a). The PVM prepared in the present work show a decompossition point at 225°C. Acrylamide (Fluka AG) was used without further purification. Potassium persulphate ($K_2S_2O_8$) from BDH,AR grade , was used as thermal initiator at 60°C.

The polymerization experiment were carried out in a 50 ml conical flask containing 25 ml distilled water and the desirable quantities of PVM particles (sieved to particle size of ~ 70 μ) suspended in water, acrylamide momomer and the persulphate initiator . The polymerization mixture was purged with argon (99.9%) for 10 minutes before heating with contineous strring at 60 +1°C.

The grafted copolymer was isolated from the polymerization mixture by filtration and washed three times with warm water to remove the polyacrylamide homopolymer adhered on the grafted coplymer particles, which is then dried under reduced pressure at 50°C for one hour . The decomposition of the grafted coplymer started about 190°C. The grafted products were characterized by the following parameters

Weight conversion WC% = A/B x100 ..... (3)

Grafting percentage GP%=A-B/Bx100.....(4) (yield of grafting)

where A and B are the weight of graft copolymer and poly(vinyl mercaptan) respectively. Qualitative analysis of the nitrogen in the grafted copolymer was done adopting the Na-fusion/FeSO4 method described by Shriner et. al.[9]. The infra red spectra ecorded Pye-Unicam SP 3-100 spectrophotometer using KBr disc technique. Thermogravimetric analysis (TG) was carried out by Netzsh -4001 instrument with heating rate of 10°C/minute.

RESULTS AND DISCUSSION

Identification of the Grafted Copolymer

The grafted copolymer of poly(vinyl mercaptan) with acrylamide were charactrized by infra red spectra . Figure-1 illustrates the IR

spectra of poly(vinyl mercaptan) before grafting process (figure 1-a) together with the infra red spectra of both grafted poly(vinyl meraptan) with acrylamide (figure 1-b) and that of polyacrylamide homopolymer (figure 1-c) . Comparison of these spectra suggested the grafting of acrylamide onto poly(vinyl mercaptan) had occured. The strong broad band appears at 1615 cm^{-1} in spectra b and c in figure -1 is attributed to be the c=0 stretching vibration of the amide group. This was in a good agreement with literature data (~ 1620 cm^{-1}) (10,11) . The weak band appears at about 630 cm^{-1} is asigned to the aliphatic C-S bending vibration (11) that appears in both nongrafted and the grafted PVM (spectra a & b in Figure - 1) . Moreover, the very strong broad bands located between 3300 - 3500 cm^{-1} which are belong to the N-H strectching vibrations of the amide group (11), and these clearly appeare in the IR spectra of grafted PVM and the homopolyacrylamide. The broad band at nearly the same frequency for poly(vinyl mercaptan) is attributed to the (-SH) stretching vibrations arise from the unconverted hydroxyl groups in poly(vinyl alchol)(8), the starting material of PVM(see reaction scheme 2).,thermogravimetric analysis of the grafted copolymer and PVM were also carried out. The result are shown in figure 2 which clearly indicates that grafted copolymer become much less thermally stable than PVM. As seen from Figure 2, the grafted copolymer starts to decompose at about 250°C, whereas PVM is thermally stable at this temperature. This result suggests the grafting of acrylamide on PVM polymer has occured. In addition , the grafted copolymer show a positive test for gualitative nitrogen analysis using Na-fusion / $FeSO_4$ method(9), which is also indicate that acrylamide has grafted on PVM, since the latter does not contain nitrogen element in the polymer chain, and nitrogen only comes from the acrylamide units in the grafted copolymer. The difference in the decomposition point o the grafted copolymer (~190° C) and PVM (~225°C) might be also considerd as an indication of the occurance of the graftization.

Effect of Reaction Conditions on Yield of Graft Copolymer

To quantify the efficiency of the thermal grafting process, the yield of copolymer(weight conversion WC% and grafting percentage GP%) were determed gnavimetrically after the complete seperation of the polyacrylamide homopolymer. The extent of conversion was followed in the present system ass a function of reaction condition. figure 3 represents the changing in weight conversion and grafting percentage as a function of acrylamide monomer concentration, keeping other parameters constant (such as initiator concentration ,quantity of PVM used and the reaction time). It is clear from figure 3 that both grafting percentage and weight conversion increase with oncreasing monomer concentration up to 0.4 M and then reaches a plateau value.

The yield of grafting was also studied as a function of initiator concentration (figure 4.) and reaction time (figure 5.). In both cases the yield of grafting increase linearly with incresaing initiator concentration (figure 4.) or reaction time (figure 5.). longer reaction times of higher initiator concentration could not be reached because the formation of very viscous solution due to the production of large quantities of plyacrylamide homoplymer.

However. it has been found that variation of weight of the prepolymer (PVM) used has no effect on the grafting yield which appears to be nearly constant in the range between 5 - 15 g/l of PVM, (all other parameters were kept constant) . This is expected directly on the monomer and initiator concentration and is not very much affected by the quantities of the pre-existing polymer(8).

Mechanism of the Graftization Process

The grafting of acrylamide onto PVM in the present system should be initiated by the creation of macro radicals either directly on the backbone of the PVM pre-existing polymer chain or on the pendant groups in the ploymer chain. Since the double bond is not exist in PVM polymer chain, radicals responsible for initiation of grafting process should be formed through the chain transfer process to PVM polymer chain. It is well established that the reactivity of mercaptan (RSH) in transfer reaction to a free-radical in chain addition polymerization in much higher than the reactivity of other class of organic compounds (including the aliphatic amins and halocompounds which are known to be active transfer agents)(12,13,14). In fact the

activation energy of alkhyl mercaptans is less than the propagation reaction (14). Walling (13) evaluated the velosity coefficients K_{fs}(at 60°C) for transfer to alkhyl mercaptans with many radical derived from vinyl monomers and found that the chain transfer constant ($C_s=K_{fs}/K_p$) ranged from 60 to 0.2 depending on the type of macroradical that abstract mercaptyl hydrogen through the transfer process. The values of C_s for mercaptans are considered many hundered folds higher than, for example, aliphatic amines (~7.0×10^{-5} to 0.6 depending on the type of macroradical) or organic halides (0.4×10^{-5} - 1.3)(12). Walling (13) explain the very high reactivity of mercaptans in transfer reactions by the ionic contribution of the transition state of the type : (R^+ HS^- R^4 and R^+ H^- SR') . The type and nature of intermediates, in general, depend on the electron donating or accepting properties of the free radical.

Accordingly in the present system, one would expect that the macroradical produced in PVM that responsible in grafting of acrylamide in derived from polymeric radical through the mercaptyl hydrogen abstraction process according to (5) :

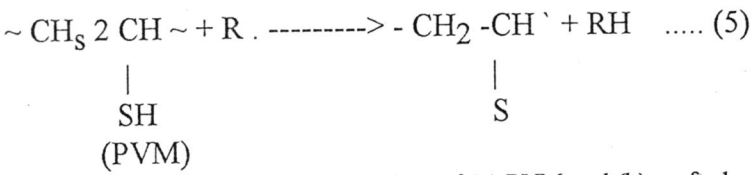

Figure 2. Thermogravimetric behaviour of (a) PVM and (b) grafted acrylamide onto PVM. Heating rate is 10° C/min.

R in equation (5) could be derived from the initiator(primary sulphate radical anion SO^-_4) or the polyacrylamide macroradical produced by the direct initiation with persulphate initiator :

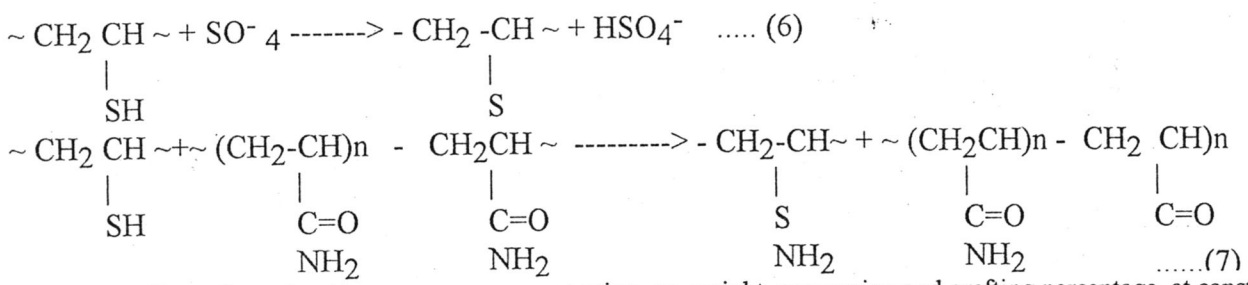

Figure 3. Effect of acrylamide monomer concentration on weight conversion and grafting percentage, at constant concentration of PVM (8g/l) ,[$K_2S_2O_8$]=0.06 M, reaction time 30 minutes at 60° C.

The rate of reaction 6 and 7 depends directly on the reactivity of the radical with -SH groups in PVM. At this stage of this study, we could not differenciate which recation (6 or 7) is responsible for production of macroradical before the grafting process. However, the production of larg quantities of polyacrylamide homopolymer during the process might suggest that reaction (7) is more important than reaction (6) in transfer reaction and hence on graftization process. Moreover, according to Walling(13), the reactivity of -SH group in PVM toward polyacylamide macroradical is higher than that of SO_4 radical anion. Since the former radical can contribute with -SH group in PVM to the ionic transition state of the structure shown in (8).

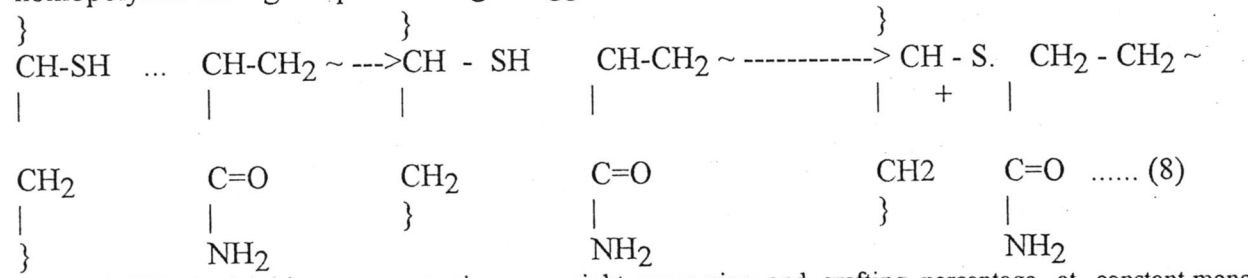

Figure 4. Effect of initiator concentration on weight conversion and grafting percentage, at constant monomer concentratiuon 0.4M,reaction

Where the SO_4 primary radical has no tendency to form such ionic intermediate with the -SH group of PVM because of the anionic nature of the free radical. Hydrogen abstraction could also happen between the free radical of the polyacrylamide grafted onto PVM and -SH group on the poly(vinyl mercaptan). If such a

reaction is fast enough , one could expect short graft chains in the grafted PVM. The average degree of polymerization of polyacrylamide chains grafted will be also influenced by the rate of primary termination with SO_4 radical anion or other chain transfer process in the system. Acid or alkali hydrolysis of the grafted PVM , copolymer to seperate the polyacrylamide graft from PVM chain, in order to determine the average number molecular weight of these grafts, was not successful because of the very low quentities of the polymer used and accordingly to the polyacrylamide grafts. Cross-linking is also expected either between polyacrylamide chains in the same PVM polymer chain or between different chains in the same or different polymer particles. This was difficult to detect and thermal gravimetric analysis (figure 2) would be not a good technique to distinguish between the grafted and cross-linked PVM polymer.

In a seperate experiment, we have tried to determine the hydrophilic property and Cu^{+2} ion sorption capacity of the PVM polymer before and after grafting with acrylamide monomer> Intial result reveals that the grafted polymer has better hydrophilic property, because the presence of the polyacrylamide grafts which is known to be hydrophilic(10), and higher Cu^{+2} sorption capacity in ion-exchange process. More systimatic experiments are needed to elaborate the improvemet of ion -exchange capacity of the grafted copolymer. In conclusion , thermal grafting of acrylamide on poly(vinyl mercaptan) by persulphate initiator is successfuly done in aqueous solution at 60° C. The graftization is mainly carried out by hydrogen abstraction from -SH group of PVM with polyacrylamide narc0radicals. The sorption of transition metal ions and hydrophilicity of the grafted copolymer is improved. Graftization with other water soluble vinylmonomers such as acrylonitrile, acrylic acid, vinyl acetate and methyl acrylate might produce different type of grafted PVM copolymers with different metal ion sorptioand other physico-chemical proerties. The preparation and study of these types of grafted copolymers is worthwile.

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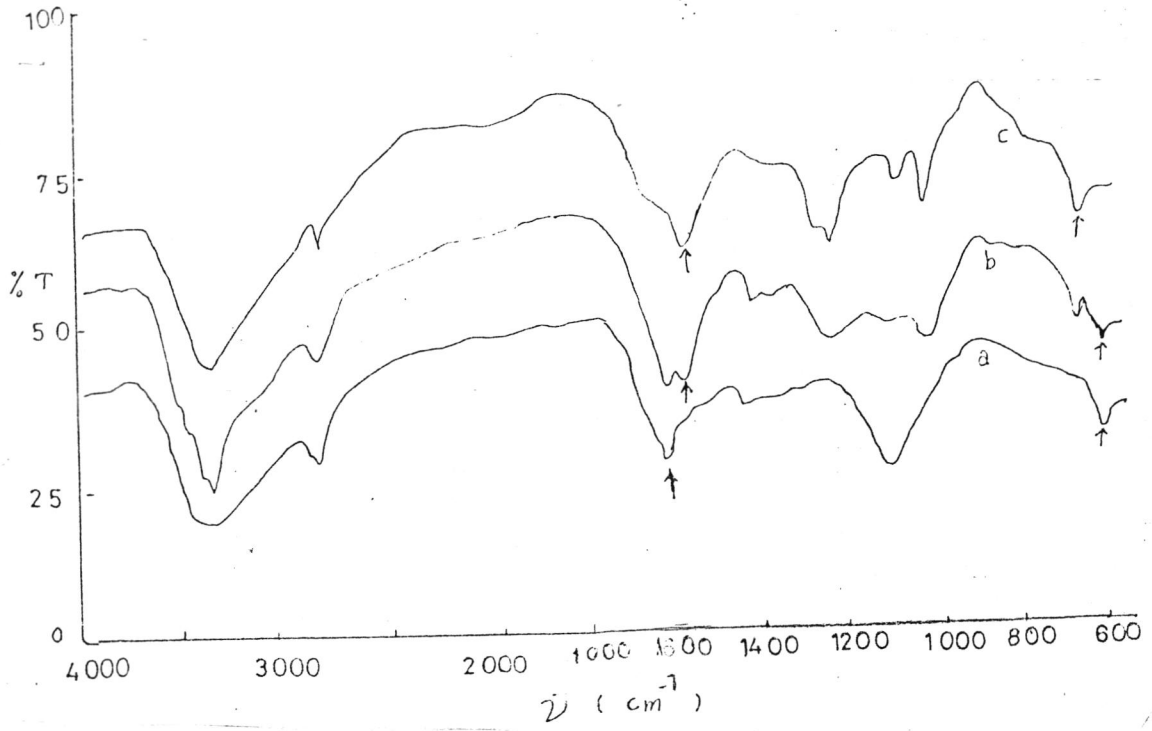

Figure 1. IR spectra (KBr Disc) of (a) PVM,(b) grafted acrylamide onto PVM and (c) polyacrylamide homopolymer.

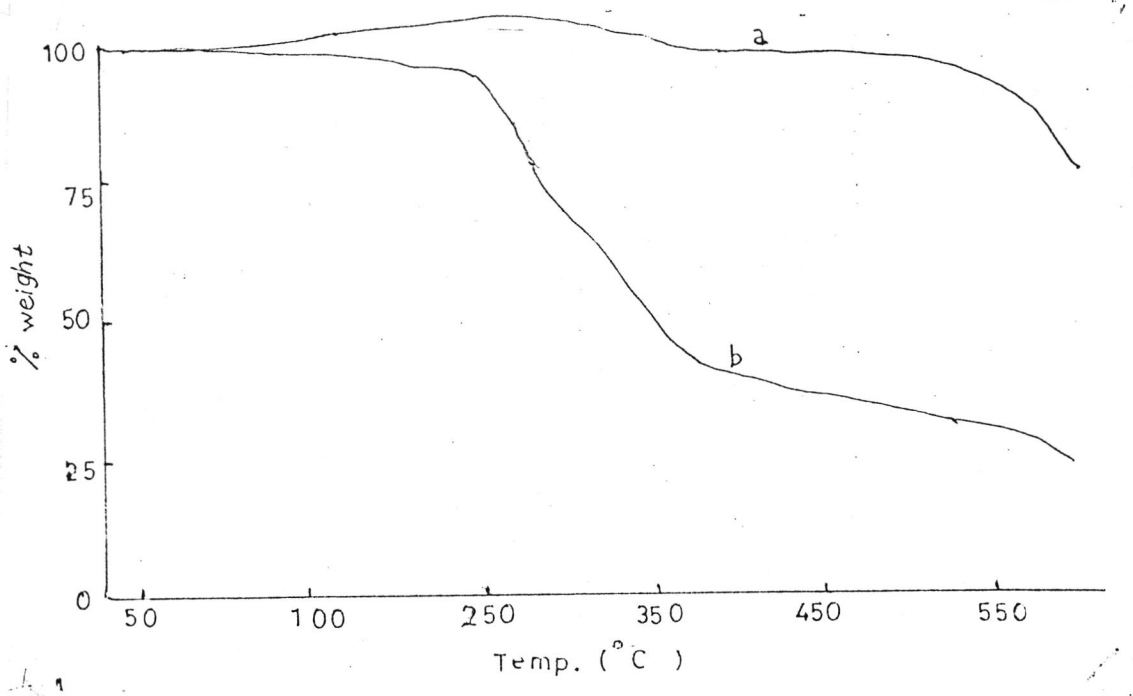

Figure 2. Thermogravimetric behaviour of (a) PVM and (b) grafted acrylamide onto PVM.Heating rate is 10°C/min.

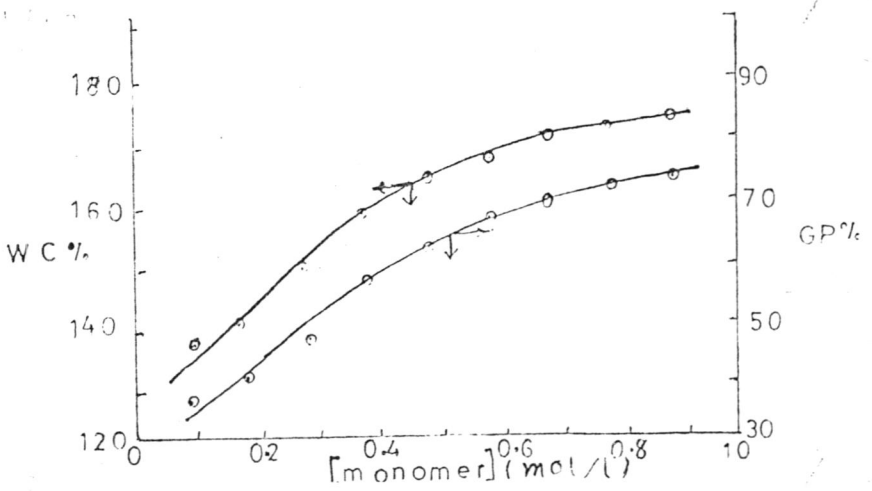

Figure 3. Effect of acrylamide monomer concentration on weight conversion and grafting percentage, at constant concentration of PVM (8 g/l), $[K_2S_2O_8]$=0.06 M, reaction time 30 minutes at 60°C.

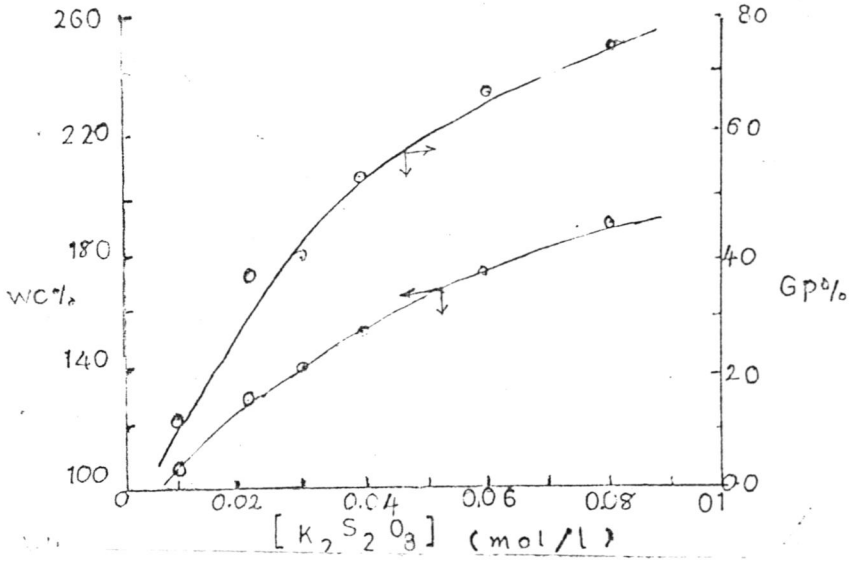

Figure 4. Effect of initiator concentration on weight conversion and grafting percentage , at constant monomer concentration 0.4 M , reaction time is 30 minutes at 60° C .The quantity of PVM kept constant (8 g/l).

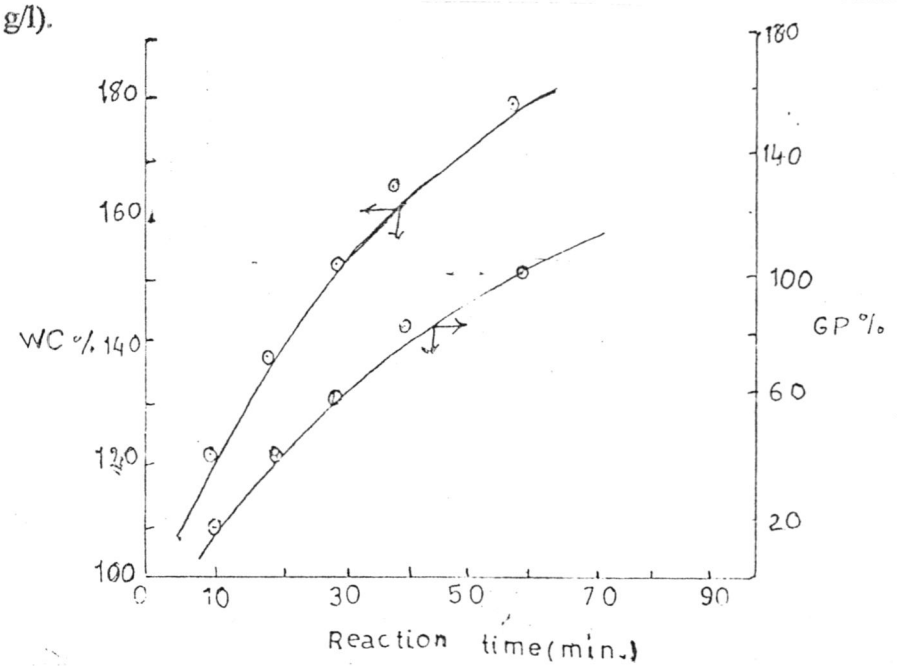

Figure 5. The variation of weight conversion and grafting percentage with reaction time at 60°C .Monomer concentration is 0.4 M, $[K_2S_2O_8]$=0.06 M and [PVM]=8 g/l.

Study of the Low Energy in the Decay Scheme of the Radioactive Isotope ^{192}Ir

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الخلاصة

لقد اظهرت قياسات الطيف النووي للنظير المشع ^{192}Ir في مجال الطاقات الواطئة بحدود 620KeV توافقا في كل من الشدة والطاقة للنتائج التي حصلت عليها من هذا البحث السابق كما ظهر في هذه القياسات وجود انتقال كافي جديد قيمة طاقته 177KeV وبشدة نسبية مقدارها 0.183+0.021 .

ABSTRACT

In this work, the decay of 74.days ^{192}Ir has been investigated.For the measurements of single gamma ray spectrum up to 620 kev,a 76.1 cc Ge(li) spectrometer with high resolution is used. From this study the energies and intensities of gamma-ray transitions are found to be in good agreement with previous results.The uncertainty concerning the existence and intensities of gamma transitions110.6, 329.1, 420.7, 447.6 KeV are clarified. In addition one previously unreported gamma-ray transition of energy 177 kev of Etative intensity 0.183=0.021 has been suggested.

INTRODUCTION

The measuremenets of properties of nuclear energy levels by nuclear spectroscopy which are concerned in this field.These properties being the angular momentum,the energy of the levels, various electric and magnetic momentum,parity and decay probabilities ,...etc.

Measurements of gamma-ray energies and intensities offer a very powerful tool to verify the validity of nuclear models.

In this work Ge(li) spectrometer was used to study some of the gamma-ray transitions in the decay of ^{192}Ir to ^{192}Pt and ^{192}Os.This isotope has been studied by Allison,J.W. et al.(1)(1960) and Cork, J.K.et al.(2) (1951), Muller,D.E. et al.(3)(1952) they were using Beta-magnetic,Crystal diffraction and Scintillation spectrometers. Roulston, K.I. et al.(4)(1952) suggested the presence of unresolved weak transition in the energy range from 900 up to 1200 kev. Palaska,T.L.(5)(1967) used Ge(li).They were resolved very close gamma ray lines. Parasad et al.(6)(1975) using Ge(li) detector and fast-slow coincidence circuit for detailed study of the gamma-ray energies and intensities in the decay of ^{192}Ir.

Source Preparation

The ^{192}Ir,radioactive source was prepared by irradiating a then foil (5 mg) of natural iridium for 48 h in aneutron flux of about 2.0×10^{14} $n.cm^{-2}. s^{-1}$.

MEASUREMENTS AND RESULTS OF SINGLE SPECTRUM

The experimental arrangement is shown in fig (1)connected to Ge(li) detector and 4096 McA which 1024 channels have been used only .The spectrum was measured in two overlapped portions to cover all of it.

Standard sources table(1) have been used to investigate the calibration curve fig(2).The energies and the relative intensities of the g - transitions are listed in table (2). All the measured transitions were proved to decay with a half life =74 day. This means that there is no any contamination activity of ^{192}Ir Sum peaks have been noticed due to pick up effect at high counting rates.

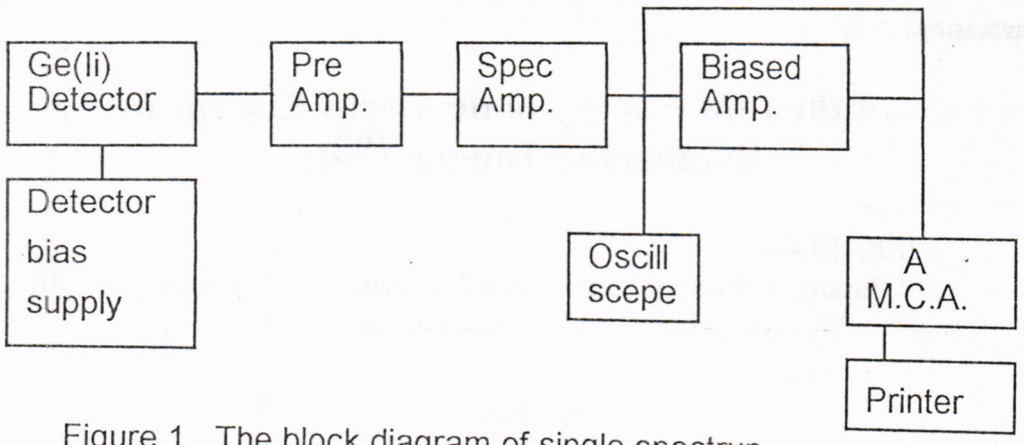

Figure 1. The block diagram of single spectrun

Table 1. The values of the energies that taken for calibration

Source	Gamma-ray Energies in kev
^{133} Ba	80 , 276 , 302 , 356 , and 384
^{183} Ta	100,156,179, and 264
^{226} Ra	186 , 241.9 , 295.2 , 351 , and 609
^{137} Cs	662
^{152} Eu	121.7 , 244.6 , 344.4 ,411.3 and 443.9

In this work all measured peak areas have been calculated,and relative to one of these areas which is considered to have an intensity 100%,Then the following equation has been used to correct the ratio for the relative efficiency curve of the detector.

where

N_n is the area of the nth gamma-ray line.

N_o is the area of the gamma-ray line,which is chosen to be 100%.

e_n is the efficiency of the detector for the gamma-ray to energy E_n.

e_o is the efficiency of the detector for the gamma-ray intensity 100%.

Analysis of Single Spectrum

The analysis of observed singles spectrum (fig. 3) in this work has shown 19 gamma-rays transitions,14 of them are in avery good agreement with previous results. The energies and intensities of 529.2 and 420.3 kev gamma transitions have excellent agreements with the calculation of reference (7).

The Disagreement in the values of energies and intensities of 594 and 593 kev. Our results have conformed the existence of 593.8 kev gamma-transitions and in an agreement with the intensity which has been calculated by reference(7).

The existence of doubted gamma-rays transitions of 110.5, 329.1, 420.7, 457.6 kev have been conformed in our results, with an

agreement of the reference 8). We were reported such transitions in our spectra as the 100 kev.

gamma ray transition and the 457 kev as well as 478 kev gamma-ray transitions. Inthis study we found the new gamma-ray transition of 117 kev relative intensity =0.188+0.02 which is fitted in the Pt-192 energy level.Fig(4) shows the decay scheme for the disintegration of ^{192}Ir to ^{192}Pt and ^{192}Os corresponding to several recent works[7,9].All the levels and transition have been conformed in this work and reported by some references are drawn by wide line,and dotted lines have never seen in this work.

The main conclusion obtained from this study is that the angular correlation technique can be used as an alternative method to study the decay scheme of such element by gamma-gamma coincidence methods.

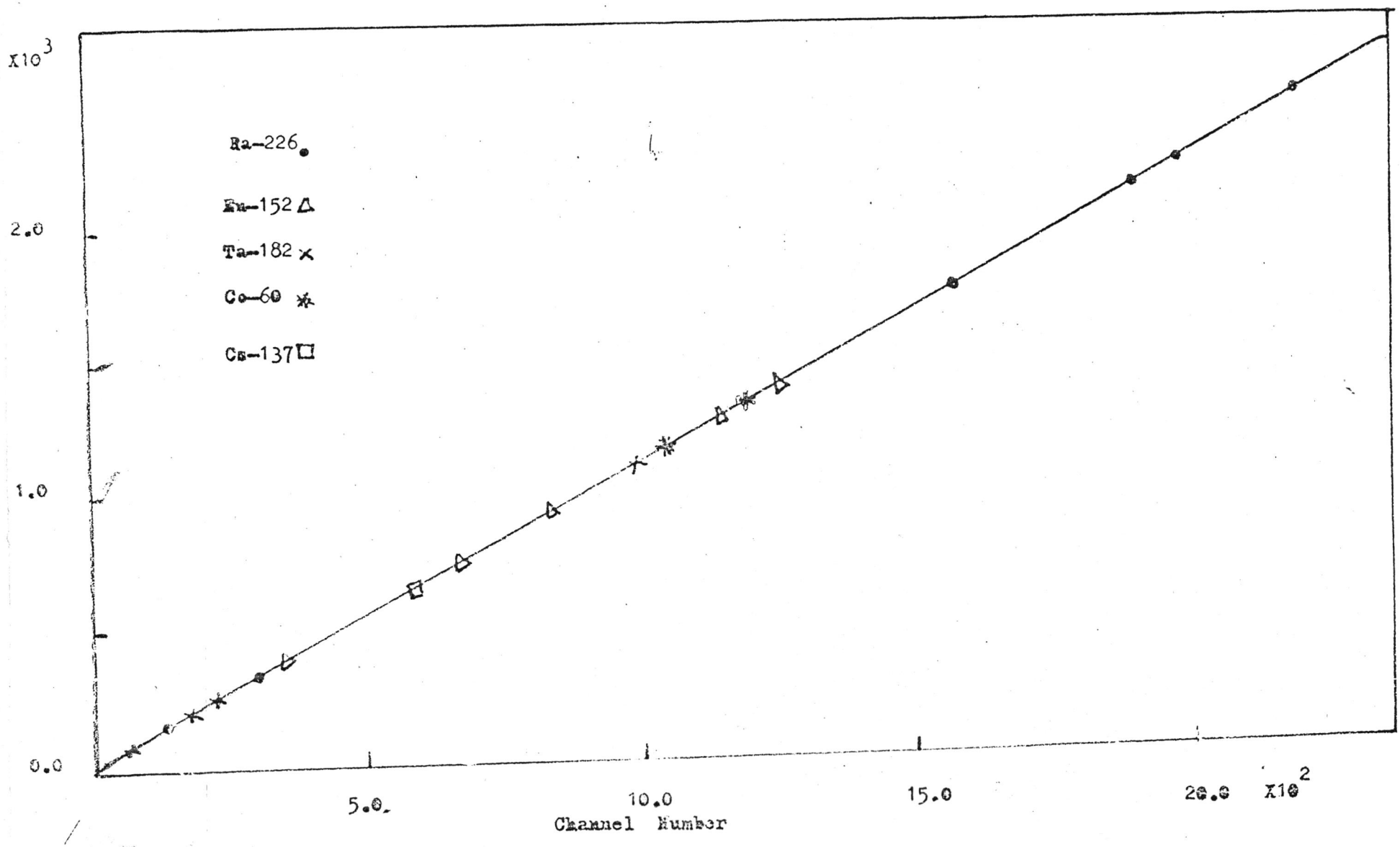

Figure 2. Calibration curve.

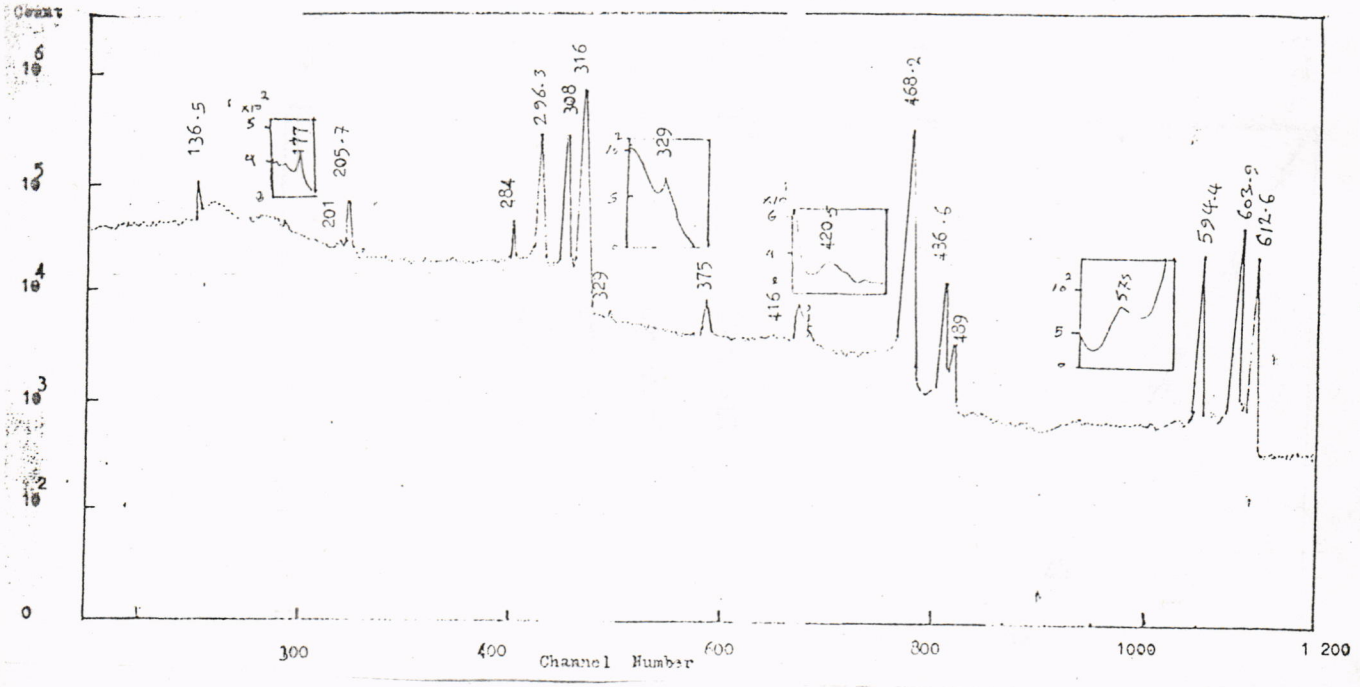

figure (3) singles spectrum of the low energy level of Ir-192 .

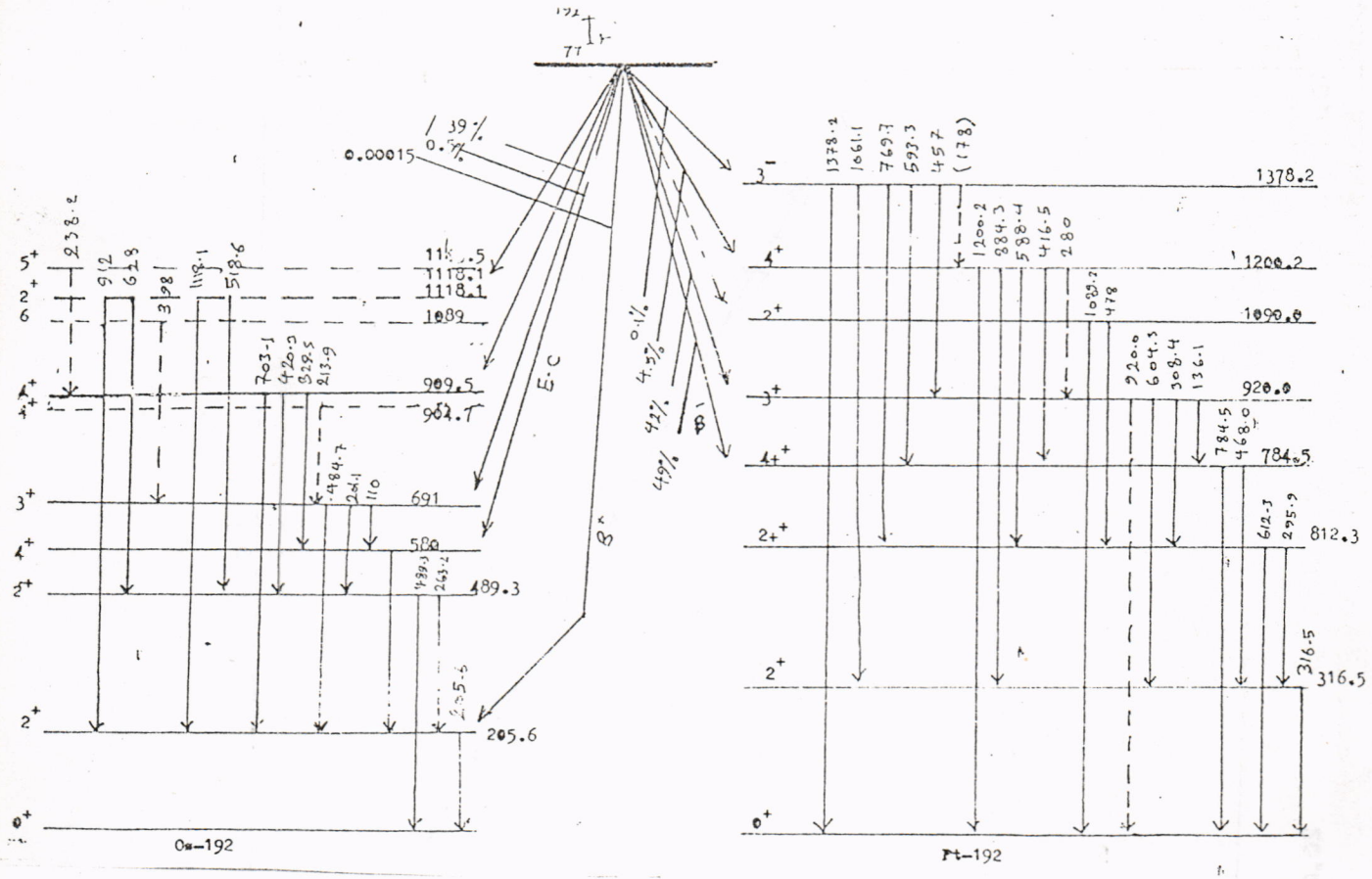

figure (4) . Level sckeme of Pt-192 and Os-192

Table 2. Energy and relative intensities of the γ-transition

Gamma-Ray Energy(kev)	Present	Ref 1975	Ref 1972
110.5	<0.0029	-------	work
136.5	0.209+0.03	0.190+0.056	0.218+0.010
177.0	0.183+0.210	--------	---------
261.0	0.840+0.002	0.560+9.050	0.551+0.010
205.7	3.720+0.150	3.900+0.490	3.860+0.080
280.0	------	-------	<0.004
284.0	0.205+0.021	0.390+0.080	0.320+0.080
296.0	35.850+0.670	35.600+1.300	34.640+0.350
308.0	35.850+0.510	37.100+0.800	35.770+0.360
316.6	100.000	100.000	100.000
329.4	0.019+0.004	------	0.019+0.003
374.3	0.903+0.020	0.790+0.030	0.875+0.015
416.4	0.764+0.021	0.890+0.640	0.802+0.019
420.5	0.068+0.002	------	0.070+0.006
457.8	0.042+0.006	0.050+0.020	0.520+0.007
467.8	54.631+1.823	59.700+2.060	58.000+0.960
478.2	0.013+0.004	0.020+0.001	0.003+0.002
485.6	3.611+1.210	4.100+0.210	3.810+0.050
489.3	0.399+0.016	0.360+0.120	0.480+0.010
575.5	0.127	-------	--------
589.6	5.173+0.395	5.460+0.200	5.520+0.010
594.4	0.038+0.008	0.100+0.003	0.045+0.260
603.9	9.987+0.901	10.200+0.600	10.040+0.260
612.6	6.630+0.264	6.700+0.0400	6.550+0.130

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د. رضا ابراهيم البياتي	أستاذ – كيمياء
د. رشيد حمود النعيمي	أستاذ مساعد – أنواء جوية
د. علي حسن جاسم	أستاذ مساعد – رياضيات
د. محمد احمد الجبوري	أستاذ مساعد – فيزياء

تعليمات النشر

١. تقوم المجلة بنشر البحوث الرصينة التي لم يسبق نشرها في مكان اخر بعد اخضاعها للتقويم العلمي من قبل مختصين وبأي من اللغتين العربية او الانجليزية.

٢. يقدم الباحث او الباحثون طلبا تحريريا لنشر البحث في المجلة على ان يكون مرفقا بثلاث نسخ من البحث مطبوعة على الالة الكاتبة بترك فراغين (double space) بين سطر واخر على ورق ابيض قياس (A4) من النوع الجيد وتترك مسافة (٢,٥) سم على جانبي كل صفحة.

٣. يطبع عنوان البحث واسماء الباحثين (كاملة) وعناوينهم باللغتين العربية والانجليزية على ورقة منفصلة شرط ان لاتكتب اسماء الباحثين وعناوينهم في اي مكان اخر من البحث وتعاد كتابة عنوان البحث فقط على الصفحة الاولى من البحث.

٤. تكتب اسماء الباحثين كاملة بحروف كبيرة (capital) في حالة استخدام اللغة الانجليزية وكذلك الحروف الاولى فقط من الكلمات (عدا حروف الجر والاضافة) المكونة لعنوان البحث، وتكتب عناوين الباحثين بحروف اعتيادية صغيرة (small letters).

٥. تقدم خلاصتان وافيتان لكل بحث، احداهما بالعربية والاخرى بالانجليزية وتطبع على ورقتين منفصلتين بما لايزيد على (٢٥٠) كلمة لكل خلاصة.

٦. تقدم الرسوم التوضيحية منفصلة عن مسودة البحث، وترسم على ورق شفاف (tracing paper) بالحبر الصيني الاسود، وترفق ثلاث صور لكل رسم وتكتب المعلومات عنها على ورقة منفصلة، ولايجوز تكرار المعلومات ذاتها في الرسوم والجداول في وقت واحد الا اذا اقتضت ضرورة المناقشة ذلك.

٧. يشار الى المصدر برقم يوضع بين قوسين بمستوى السطر نفسه بعد الجملة مباشرة وتطبع المصادر على ورقة منفصلة، ويستخدم الاسلوب الدولي المتعارف عليه عند ذكر مختصرات اسماء المجلات.

٨. يفضل قدر الامكان تسلسل البحث ليتضمن العناوين الرئيسة الاتية: المقدمة، طرائق العمل، النتائج والمناقشة، الاستنتاجات، المصادر، وتوضع هذه العناوين دون ترقيم في وسط الصفحة ولايوضع تحتها خط وتكتب بحروف كبيرة عندما تكون بالانجليزية.

٩. يتبع الاسلوب الاتي عند كتابة المصادر على الصفحة الخاصة بالمصادر، ترقم المصادر حسب تسلسل ورودها في البحث، يكتب الاسم الاخير (اللقب) للباحث او الباحثين ثم مختصر الاسمين الاولين فعنوان البحث، مختصر اسم المجلة، المجلد او الحجم، العدد، الصفحات، (السنة). وفي حالة كون المصدر كتابا يكتب بعد اسم المؤلف و المؤلفين عنوان الكتاب، الطبعة، الصفحات، (السنة)، الشركة الناشرة، مكان الطبع.

رقم الايداع في دار الكتب والوثائق ببغداد ٢٧٨ لسنة ١٩٩٠

الجامعة المستنصرية
كلية العلوم

مجلة
علوم المستنصرية

مجلد : ٧
عدد (١)
سنة : ١٩٩٦

مجلة علمية دورية تصدرها كلية العلوم في الجامعة المستنصرية
تعنون كافة المراسلات الى : سكرتير هيئة تحرير مجلة علوم المستنصرية
كلية العلوم - الجامعة المستنصرية
الوزيرية - بغداد - جمهورية العراق
تلكس : ٢٥٦٦ (صباد - عراق)
هاتف : ٤١٦٨٤٩١ أو ١-٤١٦٨٥٠٠ (بدالة) خط ٢٧٦