salicylic, *p*-hydroxybenzoic, vanillic, protocatechuic, syringic, pyrogallic, benzoic, *p*-coumaric and cinnamic acids respectively in decreasing order. Humic acid and glycine were less effective.

TABLE I

Release of phosphorus from tricalcium phosphate and rock phosphate due to action of organic acids

Acid	Tricalcium phosphate		Rock phosphate	
	pH	µg/25 ml	pH	µg/25 ml
Control ..	6·9	162·5	7·1	37·5
Citric ..	4·5	950·0	3·5	737·5
Fumaric ..	4·4	1000·0	4·0	850·0
p-Coumaric ..	5·5	375·0	4·5	100·0
p-Hydroxybenzoic	5·2	780·0	4·2	281·2
Salicylic ..	4·8	800·0	4·2	281·2
Vanillic ..	5·3	762·0	4·2	212·5
Protocatechuic ..	5·2	725·0	4·3	212·5
Benzoic ..	5·1	462·5	4·2	125·0
Phthalic ..	4·8	864·5	4·1	650·0
Pyrogallic ..	5·7	562·5	5·2	131·2
Syringic ..	5·2	746·2	4·7	200·0
Cinnamic ..	7·0	187·5	4·5	787·2
Glycine ..	4·2	375·0	4·4	275·0
Humic ..	6·2	175·0	6·0	87·5
EDTA ..	5·1	1625·0	4·7	1550·0

Aliphatic acids were comparatively more effective in solubilization of phosphates than phenolic acids. Fumaric and citric acids showed about 5 folds increase with tricalcium phosphate and about 22 and 19 folds increase with rock phosphate respectively. Johnston[5] demonstrated that hydroxy acid and tri and dicarboxylic acids were good tricalcium phosphate solubilizers. It was further reported that dibasic aromatic acids were good chelating agents but monobasic aromatic acids did not show any appreciable chelating property. EDTA which was included in the study for comparison showed the best results.

It is concluded that phenolic acids as compared to aliphatic acids were less effective in phosphate solubilization. This is due to the presence of higher number of carboxylic groups in case of citric and fumaric acids. Phthalic acid dicarboxylic acid) and *o*-hydroxybenzoic acid (salicylic acid) were comparatively more effective in this regard than other phenolic acids. More phosphorus was released from tricalcium phosphate than rock phosphate.

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ISOLATION OF A NEPHROTOXIN FROM *PENICILLIUM PICEUM*, A COMMON FOOD CONTAMINANT*

SEVERAL species of *Penicillium* isolated from corn have been reported to be toxic to mice and rats[1,2]. The toxic nature of few other *Penicillium* species have also been reported from this laboratory[3-5]. Krogh and Hasselager[6] have suggested that the nephrosis prevalent in pigs in Denmark may be due to the intake of some *Penicillium* contaminated feeds. We report here the identification and partial purification of a nephrotoxin from *Penicillium piceum*, found as a common food contaminant in stored foods. Both chicks (White Leghorn, one-day old) and mice (Swiss albino, weighing 20–25 g) were used in our experiments.

The organism, *Penicillium piceum*, was grown at room temperature in Czapek's Dox medium for twenty days. Two litres of the culture filtrate was filtered through cotton and Seitz filter and concentrated to about a twentieth of its original volume under vacuum. 1 ml of this concentrate was mixed with 5 g of sterilised commercial diet (Hindliver) and fed to the experimental mice. 100 ml of the concentrate was extracted with chloroform in a reciprocating shaker. The chloroform extract, after separation, was dried and taken in water. One ml of this fraction was fed to another group of animals.

A hundred per cent mortality was observed in chicks within 2–3 feedings of either the culture filtrate or the chloroform extract. Histological examination revealed mild hepatic and severe kidney damage in mice. Accumulation of lymphocytes and focal nephritis around blood vessels along with round cell infiltration were the changes noted. These changes were observed in mice fed with either of the fractions. Chicks and mice reared on uninfected diets looked perfectly normal and their liver and kidney sections showed normal picture.

In an attempt to purify the nephrotoxic fraction, the chloroform extract was resolved on thin layer chromatography. (Silica gel-adsorbent; Toluene:

Ethyl acetate : Formic acid-solvent system). Several fluorescent and ultra-violet absorbing bands got resolved. Each band was eluted separately with chloroform. After evaporating the solvent, the components were taken in water and feeding experiments were performed as described earlier. It was interesting to note that animals fed with one particular fraction only showed kidney damages in mice as was observed when the crude culture filtrate or the chloroform extract was fed.

The toxic component was an ultra-violet absorbing. yellow material, which resolved itself at 0·9 R_f. This toxic fraction can be distinctly separated in few other solvent systems also. It possessed UV absorption maxima at 255 mμ and 420 mμ. Structural characterisation of this acute nephrotoxin is underway.

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EFFECT OF TRIPHENYLTIN ACETATE ON THE FECUNDITY AND FERTILITY OF *DYSDERCUS CINGULATUS* F. (HETEROPTERA : PYRRHOCORIDAE)

TRIPHENYLTIN (TPT) compounds are known to have antifeedant properties for the insects[1,2]. However, Kenaga[3] applied such compounds on *Musca domestica*, *Blattella germanica* and *Tribolium confusum* to test their sterilizing properties. Since then a number of organotin compounds were tested as reproduction inhibitors on *Musca domestica*[4,5], *Popillia japonica*[6], *Diparopsis castanea*[7] and *Spodoptera littoralis*[8].

Since there is no information on the use of an organotin compound as reproduction inhibitor on the heteropterous species, in the present investigation effect of triphenyltin acetate (TPTA) has been studied on the fecundity and fertility of *Dysdercus cingulatus* F. which is a pest of cotton and other malvaceous plants.

Material and Method.—A stock culture of *D. cingulatus* was maintained at 29 ± 1° C and 70 to 80% R.H. on freshly soaked cotton seeds. From this stock last stage nymphs were isolated to obtain adults. The newly emerged adults were separately kept sexwise. Such females were brought in contact with different concentrations of TPTA (obtained from fluka, AG, Buchs SG, Switzerland) for various periods according to the method of Mustafa and Naidu[9] who applied apholate (an aziridine compound) on *D. cingulatus*. Each treated female was then paired with an untreated male of the same age. These were kept at the above-mentioned controlled conditions and freshly soaked cotton seeds were provided daily as food. Pairs of untreated males and females were also kept in similar conditions to serve as controls. Statistical method as recommended by Panse and Sukhatme[10] was also used to appreciate the significant effects.

Results and Discussion.—When the females were exposed to the lowest concentration of TPTA (0·35 mg/sq inch) for half an hour, there was no mortality and the survival period of the treated females was like those of the normal females. However, for longer exposure periods, there was about 25% mortality in the treated females before mating occurred. The survived females laid significantly less number of eggs than those of the controls. Similarly the percentage of hatching of the eggs of treated females was also markedly poor (Table I).

When the females were exposed to the higher concentration (0·70 mg/sq inch) about 40% treated females died at 4·0 and 12·0 hours exposure time before mating. However, both fecundity and fertility did not decrease significantly.

The strongest concentration of TPTA (1·40 mg/sq inch) caused 50% mortality among the treated females before mating. The fecundity of such females was almost like those females which were exposed to other two concentrations. However, there was a significant reduction in the fertility of the eggs as compared to other females. Further the females treated with the highest concentration indicated a progressive decrease in the percentage of egg hatching with respect to the exposure periods (Table I).