Table 1 — Comparison of the assays

Standard sample µg	No. of assays	Williams *et al.* method[3]		Present method	
		Av. of assays µg	Error %	Av. of assays µg	Error %
25·08	8	25·19	+0·43	25·21	+0·51
50·16	12	50·64	+0·94	49·72	−0·87
70·22	12	69·60	−0·88	70·72	+0·71
80·18	10	80·72	+0·67	79·50	−0·84
90·20	10	89·40	−0·82	89·51	−0·76

Comparative performance of the method against other methods — The new method was run along with the orthophosphoric acid-ethyl acetate method developed by Williams *et al.* for the estimation of pyrethrins, taking quantities of pyrethrins determined as per A.O.A.C. method.

For this purpose, microquantities of pyrethrins in 0·5 ml ethyl acetate solution were taken in replicates. The colour was developed according to the procedure described earlier. The absorbance was measured in Bausch & Lomb colorimeter at 395 µm using the colour reagent solution in the reference tube. The results obtained by the orthophosphoric acid-ethyl acetate and the newly developed colorimetric methods are given in Table 1. There is satisfactory agreement between the results obtained by the two methods. The results of the replicates did not vary more than 2% in both the methods.

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References

1. *Annual report, Central Food Technological Research Institute, Mysore,* 1970, 1.
2. Schreiber, A. A. & McClellan, D. B., *Analyt. Chem.*, **26** (1954), 604.
3. Williams, H. E., Dale, W. E. & Sweeney, J. P., *J. Ass. off. agric. Chem.*, **39** (1956), 872.
4. Furmanec, D., Schilling, F. A. E. & Brown, B. B., *Pyrethrum Post*, **10** (1969), 20.
5. Stahl, E., *Arch. Pharm.*, **293** (1960), 531.

A Deodorant for Use in Fish Processing Establishments

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The composition and mode of preparation of a deodorant for use in fish processing establishments are described. The deodorant has a mild disinfectant action also. The cost of production works out to Re 0.40 per litre.

REMOVAL of objectionable odours resulting from the putrefaction of wastes, wash waters, etc. is one of the major tasks faced by fish plant operators. Scientific investigations on the problem have revealed that the development of odours is closely related to the bacterial buildup in the factory environ. Odours emanating from the waste material attract flies and rodents to the processing hall, which in turn create serious public health problems. Effective removal of the undesirable odours depends largely on the use of powerful disinfectants capable of destroying most of the bacteria from the surfaces and the atmosphere within the factory. Chlorine and chlorine dioxide are used in some fish processing plants, while deodorants mainly aimed at masking the odours are used in others.

The present note gives the composition of an effective double action cleaning agent developed for use in fish processing plants. It not only helps in the removal of slime from the floor, but also leaves a pleasing aroma in the processing hall. The use of the formulation confers the additional advantage of economy.

Preparation of the deodorant

The two main constituents of the deodorant are pine oil (ISI grade), 50 ml, and the emulsifier (Teepol/whitteol$_2$/spectrol), 50 ml. The oil and the emulsifier are mixed in a 2·5 litre bottle by shaking. Water (1700 ml) is added in 100 ml lots, followed by thorough shaking for 1-2 min. The resulting milky white emulsion possessing the characteristic pleasing odour can be used for washing the floor of the processing hall and also can be sprayed in factory premises, gutters, fish landing places, etc. without further dilution. The cost of production works out to Re 0.40 per litre. The two main

Table 1 — Bacterial count of floor surface before and after washing

	Before washing	Brushing and hosing with water	Brushing with the deodorant and hosing with water
Total bacterial count/cm²	$8{\cdot}1\times10^{6}$-$3{\cdot}8\times10^{7}$	$6{\cdot}6\times10^{5}$-$9{\cdot}1\times10^{5}$	$5{\cdot}6\times10^{3}$-$2{\cdot}1\times10^{4}$
Esch. coli/cm²	150-1800	20-150	Nil
Faecal streptococci/cm²	1900-$3{\cdot}1\times10^{4}$	990-3500	Nil

precautions are: (1) Addition of water at a stretch gives dull yellow colour to the product, and (2) the deodorant should not be sprayed on surfaces coming in contact with fish.

Results

The deodorant formulated was tried in fish landing places, primary process centres and factory premises with highly encouraging results.

The product was also found to have slight disinfecting (Table 1) and fly repellent properties. Pine oil emulsions are non-toxic, non-irritating and safe under ordinary conditions of use. A special feature of the deodorant is that it can be easily prepared in fish processing factories.

Utilization of Byproduct Gypsum as an Additive to Cement Clinker

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Byproduct gypsum is available to the extent of 0·45 million tonnes per annum in the country and remains unutilized. Investigations have been carried out with the object of exploring the possibility of using it as an additive to cement clinkers in place of natural gypsum. The cement, thus produced, takes longer time to set compared to normal cements. There is also impairment of strength. These adverse effects have been attributed to the presence of phosphate and fluoride impurities in the byproduct gypsum. However, these effects can be overcome by washing the byproduct gypsum before grinding with cement clinker. The cements thus produced conform to the Indian standard specifications for portland cement. The use of byproduct gypsum as an additive to cement clinker is recommended.

BYPRODUCT gypsum, also called phosphogypsum, is obtained during the manufacture of phosphoric acid or superphosphate as per the following reactions:

$$2Ca_3(PO_4)_2+6H_2SO_4+12H_2O = 4H_3PO_4+6\,CaSO_4.2H_2O$$

$$Ca_3(PO)_2+4H_3PO_4+H_2O = 3\,CaH_4(PO_4)_2H_2O$$

This byproduct is available to the extent of 0·45 million tonnes per annum in the country and its availability is expected to increase with the setting up of new plants. It remains unutilized at present, though it finds considerable use in Japan as an additive to portland cement[1] clinker and in the manufacture of gypsum plaster products (Private communication).

Investigations are in progress at this Institute on the utilization of byproduct gypsum in the building industry. The results of studies on its use as an additive to cement clinker in place of natural gypsum are presented in this communication.

Table 1 — Chemical composition of gypsum samples

Constituent	Natural sample	Byproduct sample
SiO_2, %	6·89	5·14
$Al_2O_3+Fe_2O_3$, %	1·10	0·84
CaO, %	32·52	31·47
MgO, %	0·16	0·43
SO_3, %	38·58	41·98
P_2O_5, %	—	0·65
F, %	—	0·44
Loss on ignition, %	21·23	19·7€

Table 2 — Chemical composition of cement clinkers

Constituent	Sample R	Sample K
SiO_2, %	23·29	24·19
Al_2O_3, %	5·63	5·29
Fe_2O_3, %	1·90	2·62
CaO, %	63·56	64·04
MgO, %	4·30	3·34