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Scottsdale, Tasmania

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AFFSE REPORT 1/79

PATROL RATION (ONE MAN), NEW PROTOTYPE TRIALLED AT
EXERCISE EMU 2

D. J. LICHTENSTEIN AND S. VENKATA-RAMAN

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SUMMARY

Three new varieties of a prototype Patrol Ration (One Man) were trialled and compared with the current issue Patrol Ration at Exercise Emu 2.

The results obtained indicated that the prototype pack, as a whole, was an improvement over the current issue packs in terms of consumer acceptability and Service suitability.

These results could be used to design further prototype Patrol Ration (One Man) packs for field evaluation. (U)

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CONTENTS

	Page No.
Abstract	
Introduction	1
The Evaluation Method	3
The Exercise	3
Results and Discussion	8
Recommendations	10
Acknowledgements	10
Reference	10
Annex A. User Questionnaire	
Distribution List	

PATROL RATION (ONE MAN), NEW PROTOTYPE TRIALLED AT EXERCISE EMU 2

by

D. J. Lichtenstein and S. Venkata-Raman

INTRODUCTION

A previous report (Badcock and Lichtenstein, 1978) detailed results on the consumer acceptability and service suitability of the Patrol Ration (One Man) as evaluated through troop feeding trials. These results suggested that although the ration packs as a whole were generally satisfactory, a number of components did not meet a satisfactory standard in terms of the above criteria.

Accordingly a number of changes, were recommended to rectify these deficiencies to be followed by further user evaluation. Some changes were incorporated in a prototype Patrol Ration (One Man) and trialled at Exercise Emu 2.

Previously, one of the main causes for concern had been the freeze-dried (F.D.) meals. The six main meal varieties incorporated in the three Patrol Ration (One Man) menus are processed at the Armed Forces Food Science Establishment (AFFSE) using an Accelerated Freeze Dryer pilot plant. The meals are essentially casserole-style items comprised of "bite size" pieces of either beef, pork or mutton (but predominantly beef) together with vegetables and sauce. These meals are precooked prior to freezing and dehydration. Subsequently 110 g of the dehydrated product are packed in individual flexible foil laminated pouches for packing into individual ration packs.

However the major user criticisms attributed to these meals were related to the excessive water required in using this pack; the difficulty associated with the reconstitution of the "bite size" meat pieces; the apparent lack of, or monotonous, flavour; the excessive quantity of food per individual meal with its accompanying bulky package; and the shiny surface of the package.

Three new recipes were therefore developed to replace the less popular of the six meal types in the current Patrol Ration (One Man) packs. In addition, two new common items were incorporated in the prototype pack; raisins (50 g) and Ration Chocolate (50 g) in lieu of Candy Creamy Fudge. Also F.D. rice was replaced by Instant Potato with Onion Powder in prototype pack Menu B.

The new meal varieties were intended to overcome some of the adverse criticisms attributed to the current F.D. meals such as providing a different variety ("lighter breakfast-style" meals) in reduced quantities (75 g per pouch) with the meat pieces being more finely comminuted so as to improve reconstitution. Both the meals and the raisins were packed separately in foil laminates which had a matt green finish.

The inclusion of raisins served two basic functions; it is an item which had been frequently requested by users for inclusion in ration packs; it also made up the energy deficit resulting in the decrease in the quantity of the new meals. Candy Creamy Fudge had been found to be extremely unpopular with troops in earlier trials (Badcock and Lichtenstein, 1978). Ration Chocolate was an iso-energetic substitute. Potato with Onion Powder took the place of rice, as rice was included in the form of a composite meal. Furthermore it was felt perhaps, that potato rather than rice was a more appropriate adjunct to Roast Sliced Pork, as well as providing the much sought after variety to the packs.

The items under investigation in the two ration pack types are shown under Table 1.

TABLE 1

RATION PACK ITEMS TRIALLED

PACK	COMMON ITEMS	MENU "A"	MENU "B"	MENU "C"
Current	Candy Creamy Fudge F.D. Rice	Beef and Onions Savoury Steak Fingers	Beef and Beans Roast Sliced Pork	Sweet and Sour Pork Lamb & Vegetable Curry
Prototype	Raisins Ration Chocolate	Mince & Spaghetti Savoury Steak Fingers F.D. Rice	Curried Mince & Rice Roast Sliced Pork Potato with Onion Powder	Meat Balls Beef and Beans F.D. Rice

THE EVALUATION METHOD

Individual questionnaire cards were used to evaluate consumer reaction to the new packs. Qualitative assessment was made by the use of a 5-point hedonic rating scale ranging from "Like Extremely" to "Dislike Extremely" with a neutral "Neither Like Nor Dislike" category as the mid point of the scale.

An evaluation of the amount of items provided was made by using a rating scale containing three descriptive terms, "Not Enough", "About Right" and "Too Much".

An example of the questionnaire card is shown as Annex A. The questionnaires were subsequently analysed as described previously (Badcock and Lichtenstein, 1978).

An attempt was made also to monitor discarded unconsumed components.

THE EXERCISE

The exercise, code named Emu 2, involving the Special Air Service (SAS) Regiment was a training exercise conducted in the Pilbara region of Western Australia during May/June 1977. The aim of the exercise was to practise the squadrons as a surveillance and reconnaissance force.

For the purpose of the ration evaluation, men from I troop and K troop of 3 SAS Sqn were used as trial subjects. These troops were chosen as they either operate as an airborne force, in the case of K tp or a waterborne force, in the case of I tp. Therefore once inserted on land, they have to carry, among other things, their rations on their person. Both troops were of similar strength and composition in that they consisted of three patrols of 3 to 5 men each. (A full strength patrol normally consists of 5 men).

Once both troops were deployed there was no further physical contact between them, during the trial period. This allowed for the conduct of a cross-over experiment described below.

The experimental phase of ration consumption began when the men left base on Day 1 and terminated with the breakfast meal on Day 6. This period was divided into Phase 1 during which the men were rationed on 3 days supply of Current Patrol Ration (1 Man) (1976/77 Packing Programme) of Menus "A", "B" and "C" followed by Phase 2 during which they were resupplied with the Prototype Patrol Ration (1 Man) packs of the three menus in the case of I tp. K tp was issued initially with 3 days supply of the Prototype ration followed by a 3 day resupply of the current ration issued on Day 3.

Both AFFSE representatives were present at the initial ration issue during Phase 1—when the men were briefed and issued with questionnaire cards. Debriefing occurred also at the end of Phase 1 when completed questionnaire cards were returned and new ones issued. A further debriefing took place at the end of Phase 2 when completed questionnaires were again returned. Unfortunately it was not possible to control the return of unconsumed discarded ration components. Hence these results have not been included.

Both AFFSE representatives attached themselves to one of the patrols in each of the troops during the Prototype ration consumption phase of the trial. Once deployed, the men were involved in beach reconnaissance activity and surveillance of coastline. These activities were by no means strenuous, requiring but little physical exertion.

The troops also had access to fresh food during these periods such as seafood caught along the coastline and other wild game.

FIGURE 1

PATROL RATION (ONE MAN) QUESTIONNAIRE RESULTS

Exercise:— Emu 2

Unit:— 3 Sqn, SAS

Number of Subjects = 2x12

I Troop
 27.4 ± 3.8
 7.7 ± 2.8
 66.7

K Troop
 27.3 ± 3.9
 7.2 ± 3.4
 50.0

Average
 27.3
 7.4
 58.3

PATROL RATION (ONE MAN) 1976/77 (---) I Troop (.....) K Troop (****) All Previous Evaluations

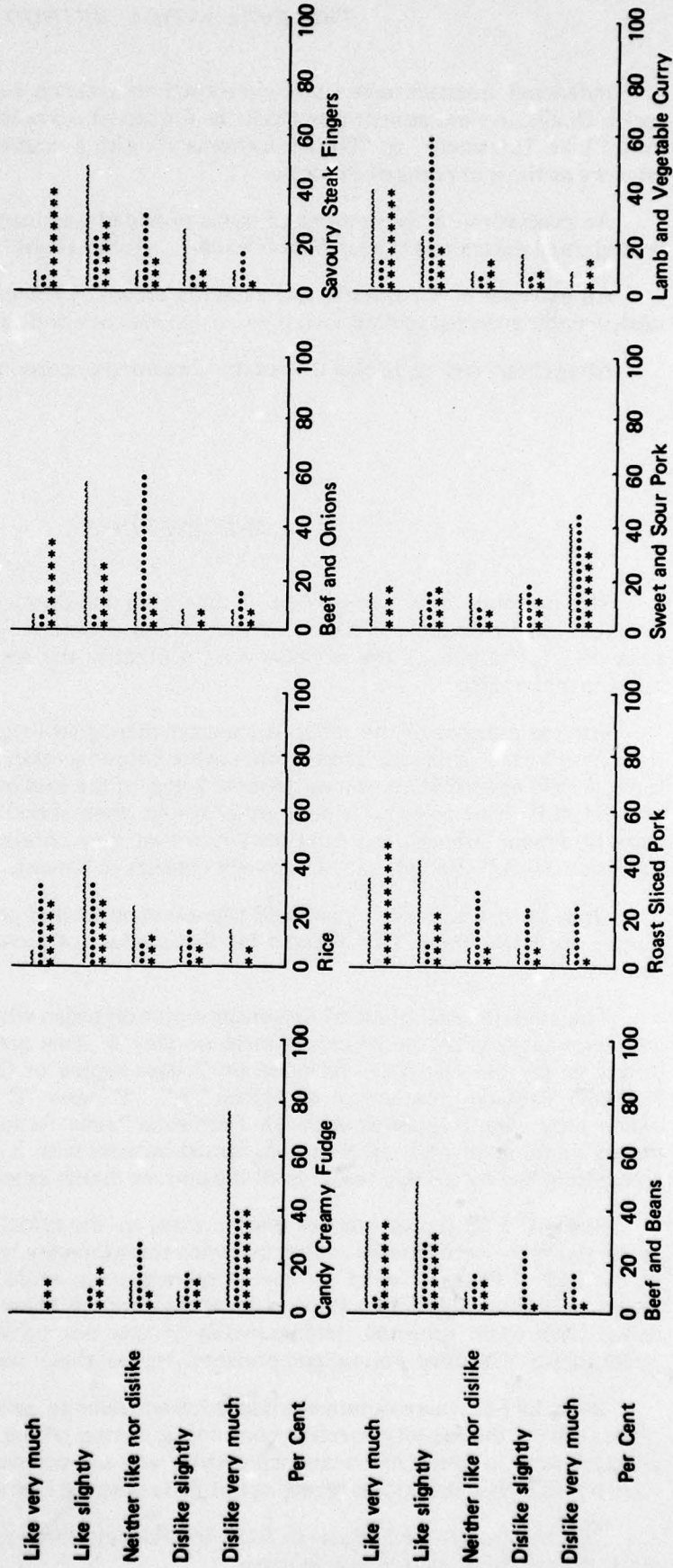


FIGURE 1 (Continued)

PATROL RATION (ONE MAN) QUESTIONNAIRE RESULTS

Exercise:— Emu 2

Unit:— 3 Sqn, SAS

Number of Subjects = 2x12

Average
27.3
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58.3

K Troop
27.3 ± 3.9
7.2 ± 3.4
50.0

I Troop
27.4 ± 3.8
7.7 ± 2.8
66.7

Average Age:
Average Years Service:
Percent Married:

MODIFIED PROTOTYPE (---) I Troop (****) K Troop (****) All Previous Evaluations

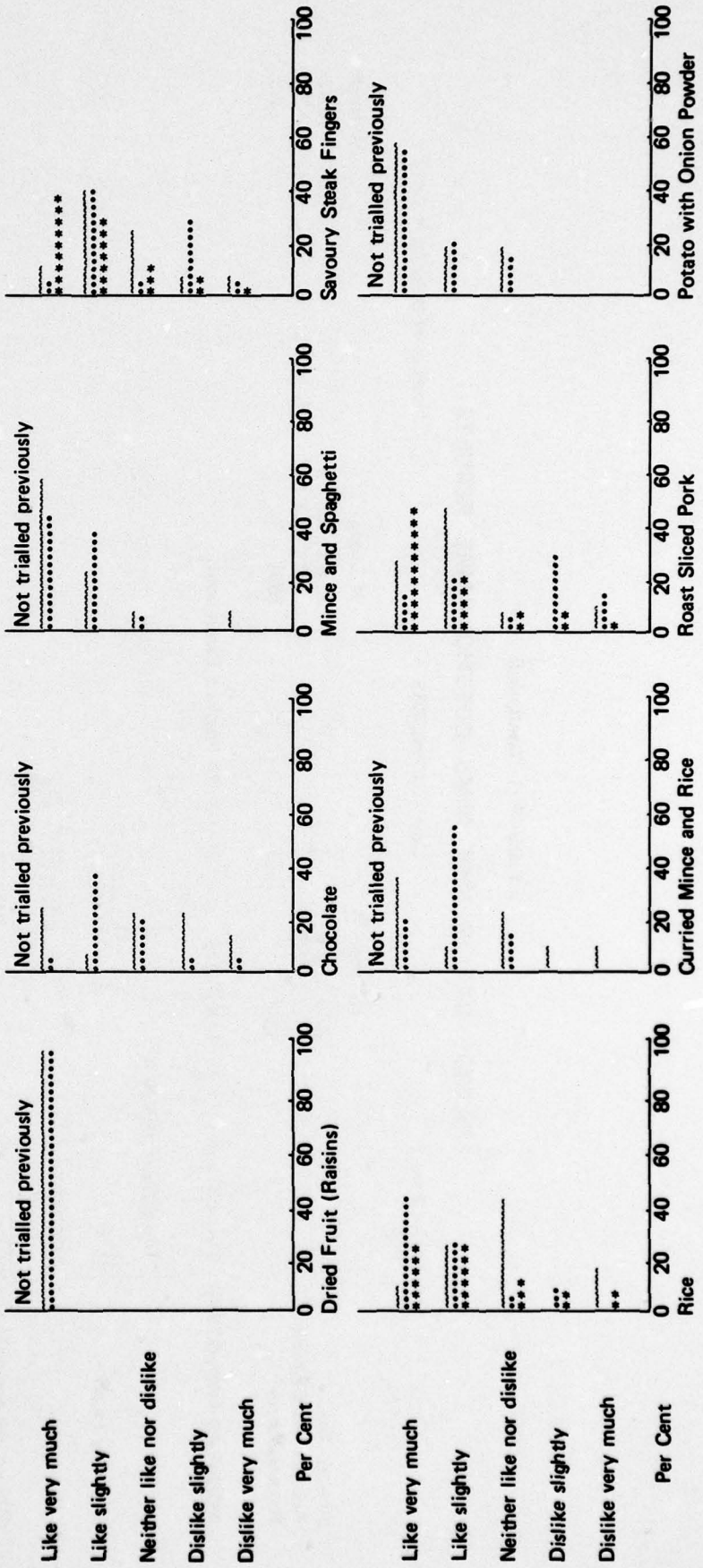


FIGURE 1 (Continued)
PATROL RATION (ONE MAN) QUESTIONNAIRE RESULTS

Exercise: - Emu 2 Unit: - 3 Sqn, SAS Number of Subjects = 2x12

	I Troop	K Troop	Average
Average Age:	27.4 ± 3.8	27.3 ± 3.9	27.3
Average Years Service:	7.7 ± 2.8	7.2 ± 3.4	7.4
Percent Married:	66.7	50.0	58.3

MODIFIED PROTOTYPE (---) I Troop (....) K Troop (****) All Previous Evaluations

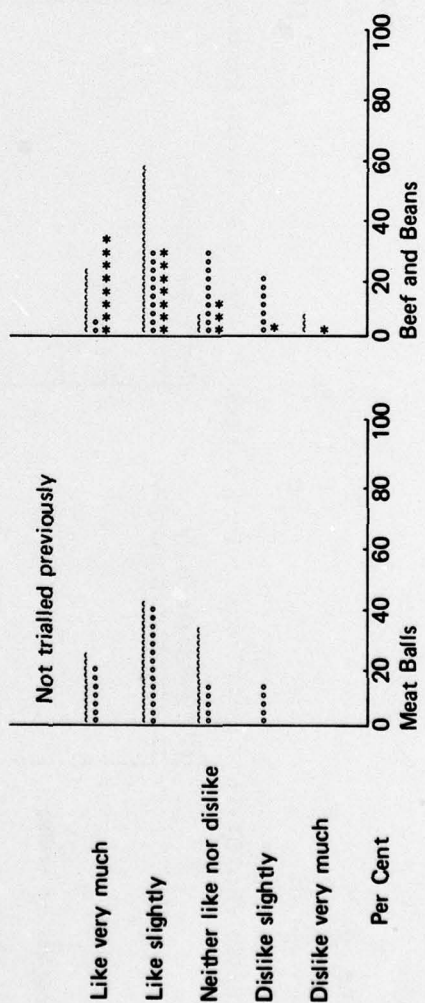


TABLE 2
PREFERENCES

PATROL RATION (ONE MAN) 1976/77		I Troop		Dislikes		Recommend Deletion	
Acceptability	(%)	(%)	(%)				
Beef and Beans	1.0	8	0	Beef and Beans	Roast Sliced Pork	0	0
Lamb and Vegetable Curry	0.8	17	8	Beef and Onions	Beef and Beans	8	8
Roast Sliced Pork	0.8	17	17	Roast Sliced Pork	Beef and Onions	17	17
Beef and Onions	0.5	25	25	Rice	Savoury Steak Fingers	17	17
Savoury Steak Fingers	0.3	25	25	Lamb and Vegetable Curry	Lamb and Vegetable Curry	17	17
Rice	0.2	33	33	Savoury Steak Fingers	Rice	25	25
Sweet and Sour Pork	-0.6	58	58	Sweet and Sour Pork	Sweet and Sour Pork	42	42
Candy Creamy Fudge	-1.6	83	83	Candy Creamy Fudge	Candy Creamy Fudge	75	75
Overall Average =	0.2						
PATROL RATION (ONE MAN) 1976/77		K Troop					
Lamb and Vegetable Curry	0.9	8	0	Lamb and Vegetable Curry	Lamb and Vegetable Curry	0	0
Rice	0.9	17	8	Rice	Savoury Steak Fingers	8	8
Savoury Steak Fingers	0.0	17	17	Beef and Onions	Beef and Beans	8	8
Beef and Beans	-0.1	25	17	Savoury Steak Fingers	Rice	17	17
Beef and Onions	-0.1	42	42	Beef and Beans	Beef and Onions	17	17
Roast Sliced Pork	-0.7	50	50	Candy Creamy Fudge	Roast Sliced Pork	25	25
Candy Creamy Fudge	-0.9	50	50	Roast Sliced Pork	Sweet and Sour Pork	42	42
Sweet and Sour Pork	-1.0	58	58	Sweet and Sour Pork	Candy Creamy Fudge	75	75
Overall Average =	-0.1						
MODIFIED PROTOTYPE		I Troop					
Dried Fruit (Raisins)	2.0	0	0	Dried Fruit (Raisins)	Dried Fruit (Raisins)	0	0
Potato with Onion Powder	1.4	0	0	Potato with Onion Powder	Curried Mince and Rice	0	0
Mince and Spaghetti	1.3	0	0	Meat Balls	Roast Sliced Pork	0	0
Beef and Beans	0.9	8	8	Mince and Spaghetti	Potato with Onion Powder	0	0
Meat Balls	0.9	8	8	Roast Sliced Pork	Meat Balls	0	0
Roast Sliced Pork	0.9	8	8	Beef and Beans	Mince and Spaghetti	8	8
Curried Mince and Rice	0.6	17	17	Savoury Steak Fingers	Savoury Steak Fingers	8	8
Savoury Steak Fingers	0.5	17	17	Curried Mince and Rice	Beef and Beans	8	8
Rice	0.1	18	18	Rice	Beef and Beans	17	17
Chocolate	0.0	42	42	Chocolate	Chocolate	17	17
Overall Average =	0.9				Rice	17	17
MODIFIED PROTOTYPE		K Troop					
Dried Fruit (Raisins)	2.0	0	0	Dried Fruit (Raisins)	Dried Fruit (Raisins)	0	0
Potato with Onion Powder	1.4	0	0	Mince and Spaghetti	Mince and Spaghetti	0	0
Mince and Spaghetti	1.4	0	0	Curried Mince and Rice	Curried Mince and Rice	0	0
Rice	1.2	0	0	Potato with Onion Powder	Potato with Onion Powder	0	0
Curried Mince and Rice	1.1	10	10	Rice	Meat Balls	0	0
Meat Balls	0.8	17	17	Chocolate	Beef and Beans	8	8
Chocolate	0.4	17	17	Meat Balls	Rice	13	13
Overall Average =	0.2	25	25	Beef and Beans	Savoury Steak Fingers	17	17

RESULTS AND DISCUSSION

ANALYSIS OF DATA

The acceptability of the individual items is portrayed graphically in Figure 1 and compared with results from previous surveys. In addition the popularity ratings or preferences of these items is presented in Table 2 in descending order of decreasing popularity.

Overall the results confirm the low popularity of certain items in the current pack reported previously (Badcock and Lichtenstein, 1978) as well as indicating the improved acceptance of the new items except one. These are discussed in greater detail below.

There were some differences accorded by the two troops, with K tp being slightly more critical of the current ration and more favourably impressed with the prototype compared with I tp; whether this was due to individual differences or whether it was due to the sequence in which the two different packs are issued, remains unclear.

Items previously shown to be unacceptable were Candy Creamy Fudge and Sweet and Sour Pork. 83% of I tp users disliked Candy Creamy Fudge (average acceptability score—1.6) with 75% recommending its deletion. The comparative figures for K tp were 58%,—0.9 and 58% respectively.

Sweet and Sour Pork was disliked by 58% with 42% recommending its deletion in the case of both tps.

The other current main meal varieties received a mixed reception, in particular Roast Sliced Pork which was rather unpopular with K tp (acceptability rating of—0.7%, disliked by 58% and its deletion recommended by 25% of the troops) whereas no members of I tp recommended its deletion.

However, on the basis of the results, it is reasonable to conclude that the current meals did not rate as highly as either of the new prototype meals, confirming previous expressions for changes in the current style of F.D. meals. Overall "Mince and Spaghetti" was the most popular (with a rating of 1.3) followed by the other two prototype meals "Meat Balls" and "Curried Mince and Rice" (each with a rating of 0.8). Also the reduced quantity of the new meals seemed quite adequate.

Of the new common items trialled, raisins was the most popular receiving a unanimous rating of 2.0 ("Like Extremely"). The quantity (50 g) was reported to be "Not Enough" by 96% of the users.

However, the other common item in the modified pack, the "Ration Chocolate" was barely acceptable with 21% of users recommending its deletion.

"Potato with Onion Powder" received a high average rating (1.4 compared with rice which had a low score of 0.6).

USER COMMENTS

Comments from K and I tp based on both packs have been combined because of the small sample size and the associated difficulty in attempting to quantify this aspect of the questionnaire analysis. Overall only 2 users failed to comment on the current patrol ration, whereas 4 users made no comments on the prototype ration. The following are some unsolicited descriptive comments made by users.

Criticisms

F.D. Meals: The meals in the Patrol Ration (One Man) become very boring and monotonous as the menus are not changed nearly often enough (25%). The Patrol Ration menus are too similar in taste and appearance (13%).

The Meatballs took too long to reconstitute. They were dry in the middle when eaten (17%). It takes too long to reconstitute the meat meals (8%). The Savoury Steak Fingers took far too long to reconstitute (4%).

The new meals especially the Mince and Spaghetti are just rubbish. This meal is usually cooked in spicy tomato sauce (4%). The meat and vegetables have an unnatural texture and an artificial flavour (4%).

The curry is hard to stomach as a breakfast meal first thing in the morning (4%). The curried meals are too strong (4%).

The meal containers should be green or brown in colour (8%). The new green meal packets are too small. The old silver packets were a better size (4%).

Biscuits: Get rid of the Jam Filled Biscuits (13%). The Jam Filled and Shortbread Biscuits become boring and monotonous after a few days in the field (8%). The biscuits in the Patrol Ration (One Man) are too dry and crush too easily (8%). The biscuits are like eating crushed concrete (4%). The Shortbread Biscuits are too thick (4%).

Instant Powdered Milk: The Instant Powdered Milk is unsatisfactory (8%). The Instant Powdered Milk should dissolve in hot or cold water (4%).

Rice: Replace the dehydrated rice with the rice used in the Combat Ration (One Man) (4%).

Chocolate: The Chocolate Ration is as repulsive as the Candy Creamy Fudge (4%). The Chocolate Block is very dry and induces thirst (4%). The Chocolate Block is unpleasant to eat (4%).

Candy Creamy Fudge: Dislike the Candy Creamy Fudge (4%). The Candy Creamy Fudge is no good in hot climates (4%).

Chewing Gum: Get rid of the Chewing Gum (4%). The Chewing Gum is always stale (4%). The Chewing Gum flavour goes quickly (4%).

Suggested Improvements

The dried fruit was very good. A larger quantity should be added (92%). The dried fruit should be the same as in the New Zealand ration packs, i.e. apples and apricots (4%).

Add a variety of spices to the ration to improve the flavour of the F.D. meals, i.e. flavoured salts, Worcestershire, Chilli, Soy and Tabasco sauce (71%). All meals could contain more herbs to make them tastier (4%).

Add a larger variety of menus to the Patrol Ration (8%). The new meals are a step in the right direction as they offer a larger variety of flavours (4%). The new meals combined with the old meals would add a lot more variety to the Patrol Ration menus (4%). Combine the dehydrated meals with canned meals to provide more variety (4%).

The Mince and Spaghetti and Meatballs are an improvement in flavour on the old meals (4%). Introduce a F.D. meal containing fish (4%).

Vary the type of biscuit in each Patrol Ration (One Man) menu (8%). Introduce a better variety of biscuits to the Patrol Ration (4%). Add cheese or Vegemite and dry biscuits to the Patrol Ration (4%). Replace the Jam Filled Biscuits with dried fruit (4%).

Add peanut bars to the Patrol Ration (4%). Add a cereal or Muesli bar to the packs (4%). Add a tube of honey (13%).

Introduce a block of dried meat (jerky) (8%).

Introduce a darker variety of chocolate to replace the present chocolate block (25%). Add a creamier variety of chocolate to the Patrol Ration (One Man).

Add hard boiled sweets such as Barley Sugar to replace the Candy Creamy Fudge (8%).

Replace the sugar cubes with granulated sugar packed in individual sachets (21%). The salt sachet should be made out of a different material so that it can be resealed for later use, once opened (13%).

Add a different drink, e.g. Milo, to add more variety to the brew material (13%). Add a larger quantity of brew material (8%). Replace the Instant Powdered Milk with Condensed Milk in tubes (17%).

Add another sachet of Fruit Juice Powder to the Patrol Ration (One Man) packs (4%). Design the Patrol Ration (One Man) packs along the same lines as the U.S. ration packs.

RECOMMENDATIONS

In any improvement to the pack, the users' views should be accommodated wherever possible. However, as it is virtually impossible to design a pack around each individual user's needs and wishes, consideration can only be given to the predominant view—defined for our purposes as the statistically average user.

Generally the new items on trial (with the exception of Ration Chocolate) were well received by the user and could be incorporated as components in new and improved patrol rations. Furthermore, there seems to be an overwhelming desire to improve the monotony of the packs by extending the range of pack varieties with the inclusion of more spices and other additives to boost the flavour.

It should be easier to rectify the range of menus available, but as a result of some of the user's comments (for example the aversion by some to curried meals), the inclusion of a number of spices and additives are best provided by the user on an individual basis according to his tastes and needs.

It is therefore AFFSE's responsibility to develop new recipes as well as improving old ones except those which have been shown to be unacceptable such as Sweet and Sour Pork. A minimum of five pack varieties should be provided. These should also take into account previous recommendations (Badcock and Lichtenstein, 1978).

Despite the proposed changes, there is still a need for user education as pointed out by some of the comments which, for example, on one hand criticise meals in which difficulty is experienced with their reconstitution yet advocate the introduction of raw or hot-air dried rice in favour of "instant" F.D. rice.

Nevertheless all meals, besides being acceptable to the sight and taste of users must have minimal reconstitution problems associated with them before incorporation into the packs.

Further field evaluation trials should be conducted with SAS under hot arid conditions following an extended stay in the field of about four weeks. During this period no supplementation of the ration should be allowed and ration discards should be collected to verify data from questionnaires.

ACKNOWLEDGEMENTS

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We acknowledge the assistance of Messrs. W. Badcock and D. Dunkley in the analysis of the questionnaires.

REFERENCE

Badcock, W. E. and Lichtenstein, D. J. (1978) AFFSE Report 4/78.

Please tick whichever boxes you think best describe the QUALITY and the QUANTITY

	Common Items			Menu A			Menu B			Menu C		
Quality	Candy Creamy Fudge	Rice	Beef and Onions	Sav. Steak Fingers	Beef and Beans	Sliced Pork	Sweet & Sour Pork	Lamb Curry				
Like EXTREMELY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Like MODERATELY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neither Like Nor Dislike	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dislike MODERATELY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dislike EXTREMELY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did Not Try It	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quantity												
Not Enough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
About Right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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