

A NEW HORIZON IN FARMER'S LEVEL EARLY DETECTION OF HIDDEN MASTITIS USING THE INNOVATIVE SURF FIELD MASTITIS TEST

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INTRODUCTION

All over the world, mastitis, or swelling of the udder, is considered to be the most important production-limiting disease of the dairy industry. This dairy scourge not only reduces the milk yield of affected animals (nearly 15 to 20%) but also renders the milk unsuitable for human consumption. Mastitis results from the growth of germs in the udder. It occurs in two forms: **(1) Clinical mastitis** in which there is visible swelling in the udder/teat and noticeable changes in milk such as flakes, clots etc. **(2) Sub-clinical**, or hidden, mastitis in which swelling in the udder is so mild that there is no visible change in the milk or in the udder/teat.

The subclinical, or hidden, form of mastitis is 15-40 times more common than clinical mastitis. Clinical cases are preceded by the hidden form of mastitis. Research conducted in Pakistan over the past four decades has shown that about 25% of cows and 15% of buffaloes are afflicted with the subclinical form of mastitis. An early diagnosis of hidden mastitis is imperative to save the udder and prevent transmission of disease-producing organisms to other animals in the herd. It is also important from the public health viewpoint in so far as the milk of animals affected with sub-clinical mastitis contains disease producing bacteria, their toxins, abnormal milk constituents as well as pus cells.

Mastitis, like any other inflammation in the body, causes a tremendous increase in the number of white blood cells in the milk (pus cells). In the context of milk, these cells are called milk somatic cells. Researchers at the Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad, (Pakistan) have pioneered a study demonstrating that a 3% solution of a house-hold detergent viz. Surf Excel (Unilever Pakistan Ltd.) can be used for an early farmer's level detection of sub-clinical (hidden) mastitis. This test has been named the **Surf Field Mastitis Test**. A test kit utilizing locally available materials has also been fabricated and is now commercially available from Rainman Pvt. Ltd. 5 Shalimar Link Road, Lahore 54840 Pakistan; Mobile # 0321-9469359.

Unique attributes of Surf Field Mastitis Test

The desirable features of this innovative mastitis detection test include:

a. Compatibility with the technical capabilities of farmers who happen to be mostly illiterate in the developing countries. Owing to a facile nature of the test procedure, even an illiterate farmer can learn to conduct this test within a few minutes.

b. Desirable sensitivity (72.81 and 66.22 in cows and buffaloes respectively) of detection *vis-à-vis* other expensive similar tests like California Mastitis Test (75.73 and 70.27 cows and buffaloes

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respectively; Muhammad *et al.*, 2010, Tropical Animal Health Production 42: 457-464) and the gold standard of mastitis diagnosis i.e. microbiological examination of aseptically collected milk samples.

c. Availability of the required reagent, i.e. Surf Excel Powder (Unilever Pak Ltd.) in almost every village.

d. User friendly nature of the test.

Procedure of Surf Field Mastitis Test and its interpretation:

a) Procedure

1. Prepare a 3% solution of the household detergent viz. Surf Excel (Unilever Pak Ltd.). To this end, dissolve 5-6 teaspoonfuls of the Surf Excel powder in $\frac{1}{2}$ liter of ordinary water. Pour this solution into a plastic bottle, apply a lid and place the bottle in a dark place. This reagent is good for about 3 months.

2. Collect 10-15ml of milk from each teat in separate container like tea cups. If the Surf Field Mastitis Test paddle is available, there is no need to collect milk samples into tea cups as the milk from individual quarters of cow and buffalo can be collected into individual receptacle of this paddle.

3. Mix the milk from an individual teat and the Surf solution (3%) in approximately equal proportions (i.e. add 10-15 ml 3% Surf solution).

4. Rotate the mixture of milk and the Surf solution for about 15-20 seconds.

5. Examine the mixture for thickening or any other change.

b) Interpretation

If the hidden form of mastitis (subclinical mastitis) is present in the quarter of udder, the mixture (milk + Surf solution) will thicken (i.e. gel formation) within 15 seconds. The udder is free of subclinical mastitis if the mixture remains liquid

and there is no thickening of mixture of milk and Surf solution.

As mentioned earlier, a Surf test kit is now commercially available from Rainman Pvt. Ltd. 5 Shalimar Link Road, Lahore 54840 Pakistan; Mobile # 0321-9469359. The milk from Surf test positive quarters of udder is not wholesome for human consumption and should be discarded. As subclinical mastitis is antecedent to clinical mastitis, many Surf test positive quarter (s) will develop clinical form of the disease in the future.

Uses of the Surf Field Mastitis Test in mastitis treatment, control and public health

1. All farmers should conduct Surf Field Mastitis Test on all quarters of all milch animals at fortnightly intervals. In the event of a positive test reaction in one or more udder quarter(s), immediately contact the local veterinarian for treatment and advice on mastitis treatment and control.

2. Whenever there is reduction in quarter yield, the Surf Field Mastitis Test should be conducted to rule out the possibility of mastitis as the cause of reduced milk yield.

3. Lactating animals should be divided into Surf test positive and Surf test negative groups. The Surf test negative group (mastitis free animals) should be milked first because the germs, which cause mastitis are transmitted from mastitis-affected (Surf test positive) to healthy animals through milkers' hands at the time of milking.

4. Always conduct the Surf Field Mastitis Test when purchasing new cows and buffaloes. Purchase only Surf test negative cows and buffaloes.

5. Milk from Surf test positive animals is unfit for human consumption because it contains a lot of germs, their toxins and pus cells (somatic cells) and abnormal milk constituents.

6. The processing of milk by the milk processing plants which gives a positive Surf test reaction results in sub-optimal and substandard finished products like yogurt, cheese, etc. The dairy industry (milk plant) management should, therefore, train their field staff and farmers about the procedure and uses of this innovative and nifty mastitis detection test.

Adoption of innovative the Surf Field Mastitis Test (SFMT) in Pakistan and other countries

Because of the ease of execution, the desirable sensitivity of detection, and the inexpensive and user-friendly nature of the SFMT, thus far it has found applications/recognition with the organizations indicated hereunder:

i. Military dairy farms throughout Pakistan conduct this test on a routine basis under instructions from GHQ.

ii. The test has become a part of the training curricula of Remount Veterinary School, Sargodha, Livestock Production Research Institute, Bahadur Nagar, Okara, Livestock Extension Training Centre, Bahadur Nagar, Okara, In-Service Animal Husbandry Training Institute (IAHTI) Peshawar, Buffalo Research Institute Bhunikey etc.

iii. It is a routine test at veterinary hospitals in Punjab and other provinces.

iv. The Pakistan Dairy Development Company (State Cement Building Corp., near Lahore Race Club, Kot Lakhpat, Lahore, Pakistan; Tel: 042-9262065-68) has registered nearly 1000 dairy farmers from all over Pakistan. Through its network of Farm Production Advisors, Pakistan Dairy Development Company is promoting the use of the Surf Field Mastitis Test among the registered farmers for the purpose of mastitis treatment and control and improvement in milk quality.

v. The Directorate of Animal Disease

Surveillance and Reporting, Livestock and Dairy Development Department (Punjab) through its field staff is training the dairy farmers in Punjab on the use of the Surf Field Mastitis Test in diagnosis, treatment and control of mastitis.

vi. The test is being used in other countries like UAE, China, Nepal etc.

vii. SAIC (SAARC Agricultural Information Centre, Dhaka, Bangladesh) has developed a video on SFMT for demonstration of the test to farmers and extension agencies operating in SAARC countries. This video can be had from SAIC (www.saic-dhaka.org). SAIC has also recognized the Surf Field Mastitis Test as a success story in the book entitled “**SUCCESS STORIES ON TRANSFER OF FARM TECHNOLOGY IN SAARC COUNTRIES**” compiled and edited by Muhammad Abdullah and published in 1998 by SAARC Agricultural Information Centre (SAIC) BARC Campus, Farmgate, Dhaka 1215, Bangladesh, pages: 71-75. The title of the success story described in these pages is **Surf Field Mastitis Test (SFMT): an inexpensive tool for evaluation of wholesomeness of fresh milk**.

viii. Several NGOs (e.g. SUNGI, Carritas International, Bunyad) have disseminated information on this innovative test to end-users (farmers).

ix. In order to improve the quality of raw milk procured for processing and to increase the profitability of dairying in Punjab, Nestlé Milkpak is currently training its field staff on the test procedure and its uses in the early spotting of hidden mastitis. **Nestle Milk Pak is paying a milk quality bonus 20 paisa per litre of milk to those farmers who adopt the Surf Field Mastitis Test on regular basis.** Other dairy companies (Chaudhry Dairies, Olpers, Nurpure milk etc.) are likely to follow suit of Nestlé Milkpak Ltd. Pakistan Dairy Development

Company, headed by Bill McD Stevenson (General Manager, Farm Production), is yet another addition to local dairy organizations who through their network of field workers are training of farmers in the diagnosis of sub-clinical mastitis by using the Surf Field Mastitis Test.

x. UM Enterprises Pakistan Ltd. has recently signed an MoU with Business Incubation Center (email: qamarbic@uaf.edu.pk), University of Agriculture, Faisalabad, Pakistan for the legalized production of the Surf Field Mastitis Test kit.

xi. A team of workers, as a part of rendition of farmer advisory services under the Endowment

Fund project entitled ‘A Rural and Peri-Urban Outreach Mastitis Control Program Focusing on Transfer of Technologies Developed by University of Agriculture, Faisalabad’, is training dairy farmers in the diagnosis of sub-clinical mastitis with the help of the Surf Field Mastitis Test.

The innovative Surf Field Mastitis Test is the apotheosis of the onsite test for the determining the wholesomeness of milk available to the general public and to milk processing industry. The adoption of this technology epitomizes how investment in research pays rich dividends.



Figure 1. Surf Field Mastitis Test kit.



Figure 2. Milk from a buffalo suffering from clinical mastitis in 3 of the 4 quarters, there is no need to execute the Surf Field Mastitis Test.



Figure 3. Addition of 3% Surf solution to individual quarter milk samples approximately in equal proportions.



Figure 4. Positive the Surf test reaction (sub-clinical mastitis) in the two lower milk samples. Notice that the milk from the two lower quarters became thick (like the white of egg) on addition of the Surf test solution to milk.



Figure 5. Farmers being trained in the execution of the Surf Field Mastitis Test for diagnosis of sub-clinical (hidden) mastitis.



Figure 6. A youth being trained in the execution of the Surf Field Mastitis Test for diagnosis of sub-clinical (hidden) mastitis.