Academic Sciences

International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 5, Issue 2, 2013

Research Article

EFFECT OF COCOTI PALM WINE ON GASTRO INTESTINE ORGANISM, PROBIOTIC *E.COLI NISSLE 1917*

CHANDRASEKHAR.K, SREEVANI.S, SESHAPANI.P, SREEDEVI.B AND PRAMODAKUMARI.J*

Department of Microbiologys.v. University, Tirupatia.p, India 517502 Email: pramodakumarij@gmail.com

Received: 26 January 2013, Revised and Accepted: 29 February 2013

ABSTRACT

Palm wine is the fermented juice of plant sap it contains various microorganisms, sugars and chemicals. Microorganisms convert the sugars into acid and alcoholand it helps to measure the effect of palm wine and sap on probiotic bacteria,*E.coli.* A minimum inhibitory concentration was evaluated by using plating method and also measures the bacterial growth curves with the support ofspectrophotometer. The present results indicating that increase in the concentrationrange of180µl for palm sap and 120µl forpalm wine cancauses the toxic effect on the probiotic organism activity.This effect leads to dysfunction ofliver, gastrointestinal and pulmonary disorders.

Keywords: Palm sap, Palm wine, Probiotic *E.coli Nissle 1917,* Growth curves, Well diffusion test.

INTRODUCTION

Palm wine is the fermented palm sap of palm plants, which contains small quantity of alcohol and releasing carbon dioxide bubbles. The fermented beverages are those which are produced from fruit juice or plant sapby natural fermentation. In India, wild dates (*Phoenix sylvestris*), coconut palm (*Cocos nucifera*),Palmyra (*Borassusflabellifer*) are frequently used for the said purpose [1].The fermented beverages contain only very low (2.7-6%) content of alcohol [2].

Freshly collected unfermented sap is called as "Neera". It consist alot of nutrients including Potash. Neera undergoes immediate fermentation because of its natural nutrients attracts yeast present in air[3].Palm sap is a good natural media for growing fermented micro-organisms.The pH of the original palm sap is about 7.2 and after 8 hrs.It falls to 5.5 to 5.8 within ashort period, sugars are converting into alcohol; alcohol quantity is depended on time of fermentation.Palm wine fermentation is a lactic alcoholic acetic one, involving lactic acid bacteria, yeast and acetic acid bacteria as well as *Leuconostoc and Zymomonas*[4][5].This alcohol gives sour smell and sulphur like odour may also be present.It contains some toxicants. Palm wine allowed to ferment longer period up to 24 hours and above the yield is in acidic taste. Preventing this increase in acidity it may lead to inhibition of yeast activity and a poor alcohol to acid ratio. Instead of wine vinegar and acetic acid are produced [6][7].These acid compounds enter in our gastric tract when consumed.

The term probiotics was introduced in 1953 by "Werner Kollath" a probiotic bacterium that helps to maintain the natural balance of organisms in the intestine. Human digestive tract contains more than 400 types of probiotic bacteria that reduce the growth of harmful bacteria and promote a healthy digestive system. It has been suggested probiotics used to treat problems like stomach and intestine problems compared to antibiotics. Probiotics is better than antibiotics for treatment[8] because antibiotics kill both pathogenic and beneficial organisms present in our intestine that causes illness, decreases in beneficial bacteria may lead to digestive and other infections like urinary tract infections, diarrhea and inflammatory bowel diseases. *E.coli Nissle 1917* is a one of the best probiotic strain [9] It is present in our gastro intestinal tract (GIT)[10]. *E.coli Nissle 1917* was isolated by Alfred Nissle in 1917 during First World War time from feces of a solider. Now-a-days *E.coli Nissle 1917* probiotic capsules are used against inflammatory bowel diseases these capsules are called as "Mutaflor" [11] *E.coli Nissle 1917* has played a major role in treatment of inflammatory bowel diseases(IBD).

Palm wine chemicals can cause "Intestinal autotoxication" [12]. It acted to produce fever and pus in intestine the action shows effect on blood, liver and lungs.

MATERIALS AND METHODS

Culture preparation

Culture was cultivatedin Luria Bertani broth; overnight cultures were used for our experiment.

Palm sap and Palm wine sample

Palm sap and palm wine was centrifuged at 12000 rpm for 10 min, all bacteria and its debris separated by this technique.

Well diffusion method

The lethal concentration of palm wine and sap on *E.coli Nissle 1917* was determined by using well diffusion method.100 ml of Luria Bertani (LB) agar medium was prepared. Poured the agar medium into sterile petriplates allow to solidify. After solidifying the medium probiotic *E.coli Nissle 1917* was spread on the petri plates. Then the wells prepared with cork borer and palm wine and sap samples were loaded in the wells at different concentrations. Theconcentrations20, 40,50,60,80,100,120,140,150,160 180,200 µl were selected. Then allowed to incubation after 24 hours incubation period and observed the results.

Growth curves

Determined the effect of palm wine and sap on probiotic organism, *E.coli Nissle 1917*.Four test tubes were taken with 5 ml of Luria Bertani broth. Overnight broth of *E.coli* culture was taken in each tube. Sterile pipettes are used for transfer of inoculum in to the test tubes and also maintained as control and blank. Based on Minimum inhibitory concentration, 180 µl of Palm sap and120 µl palm wine were added to two tubes incubated and kept at room temperature. The O.D values were recorded for every 30 min until stationary phase reached. A graph was plotted by using recorded values and observed the results.

RESULTS

Well diffusion zones of *E.coli*

Table 1: Growth curves of *E.coli*under Cocoti sap and wine treatment

Time intervals (min)	O.D. Values		
	Control	Palm sap treated	Palm wine treated
30	0.03	0.02	0.02
60	0.05	0.05	0.02
90	0.09	0.09	0.06
120	0.16	0.12	0.11
150	0.21	0.15	0.12
180	0.26	0.17	0.12
210	0.28	0.17	0.12
240	0.28	0.17	0.12

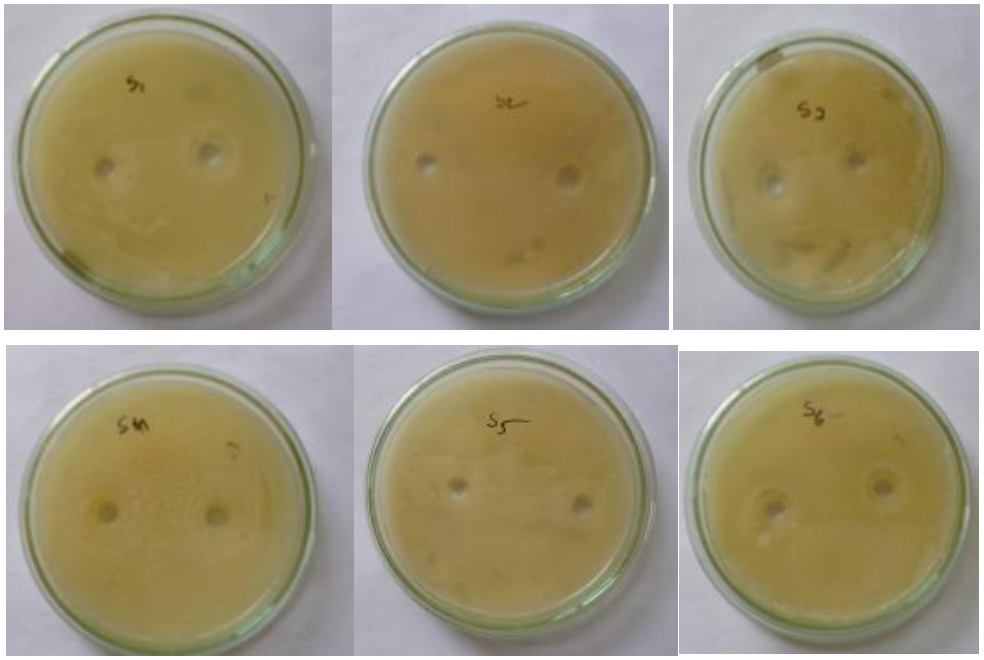

Fig. 1: Palm sap effect on *E.coli* Nissle 1917(Zone of inhibition observed at sample concentration range 180-200µl)

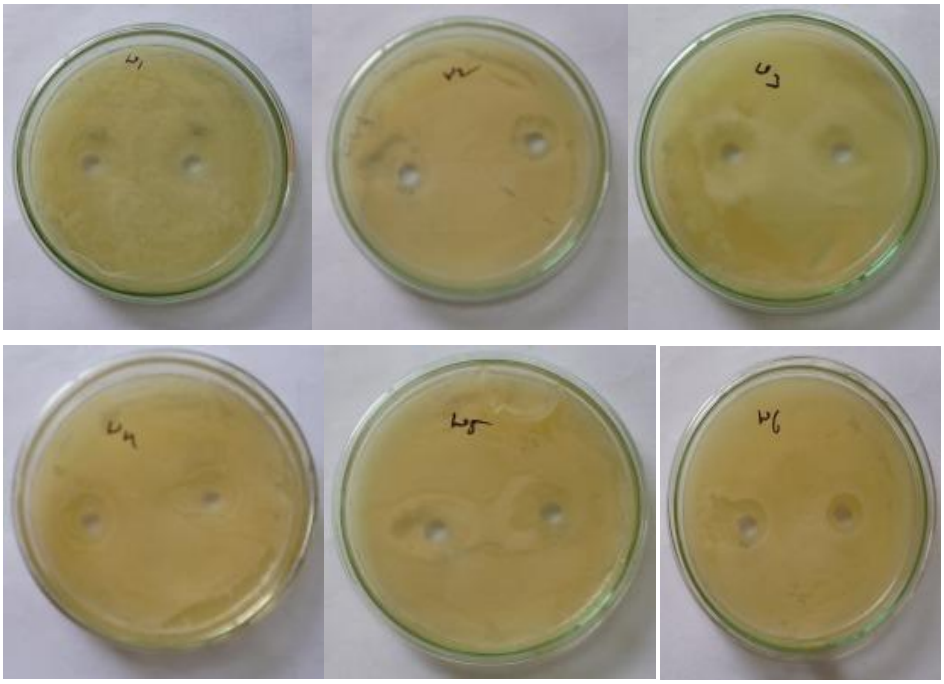

Fig. 2: Palm wine effect on *E.coli Nissle 1917(*Zone of inhibition observed at sample concentration range 120-140µl)

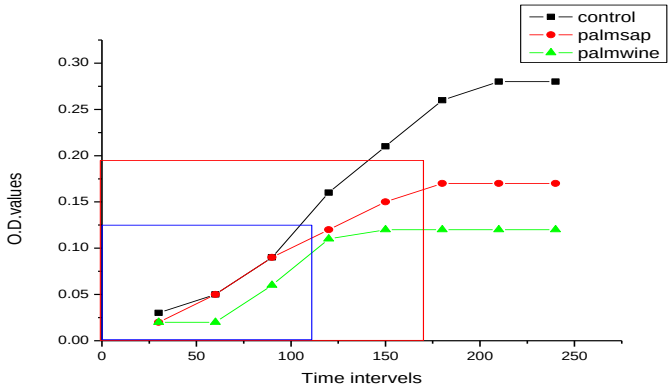

Fig. 3: Growth curves of control, sap and wine treated *E,coli*

DISCUSSION

Probiotic organisms protect our intestine against some diseases like ulcers, Crohn's diseases and some digestive problems. When consumption of high concentration of palm sap and palm wine containing chemicals like lead, iron, zinc, lithium, nitrate and potash[13]can causes damage to our intestine.

Some of the findings of literature suggested that consumption of fresh palm sap is good for health. But compared to our results, high concentration of palm sapalso and wine shows pathogenic effect on probiotic *E.coli*. High concentration of samples can affect the metabolic activities of the organism and it's proofed in well diffusion method. Low concentration range 2o-80µl in palm sap, 20-150µl range in palm wine can show slight effect on intestinal organism probiotic *E.coli Nissle 1917.* High concentration of sap and wine shows clear zones representing complete inhibition / death of probiotic organism.(Fig-1&2)

Growth curves also evidenced to the said statement. The normal samples shows higher O.D values than palm sap and also palm wine. (Table-1) Control shows normal growth compared to palm sap and palm wine treated samples.(Fig-3)Finally, we were concluded that fermented palm wine shows higher pathogenic effect on probiotic *E.coli* when compared to the palm sap. Both are harmful on gastro intestinal probiotic organisms and it may leads to the disorders of the human intestine. It is a preliminary study and also evidenced the further research work on proteomics.

REFERENCE

1. Shamala, T.R and Srikantiah, K.R. (1988).“Microbial and biochemical studies on traditional Indian palm wine fermentation”. Food Microbiology.1988; 5: 157-162.
2. Child R. “Toddy products In Coconuts”. 2nd edition.1972; pp-296-306.
3. Pramodha kumari.J *et.al* “A Review on palm wine*”.* In. J. of Res. in Biol.Sci.2012;.2 (1): 33-3.
4. OBIRE, O “Activity of *Zymomonas* species in palm-sap obtained from three Areas in Edo State”.J.Appl Sci. Environ Manag.2005;Vol.-9, No. 1, 2005;. pp. 25-30.
5. Kotiya Anil Savji ,B .Gunalan, H.Solanki(2012).“Comparative Evaluation of Toddy (Borassusflabellifer Sap) on PH Reduction and Control of Plankton Bloom in two BrackishwaterShrimp Culture Ponds”.Inter. J.ofChem.Tech Res.2012;.pp 415-424.
6. Nwachukwu, I.N; Ibekwe, V.I, Nwabueze, R.N and Anyanwu, B.N“Characterisation of palm wine yeast isolates for industrial utilisation”Afr. J. Biotechnol.2006;.pp. 1725-1728.
7. Ogbo, F.C. OnuegbuJ.A. and Achi,O.K. 2009. “Improvement of Protein Content of Garri by Inoculation of Cassava Mash with Biomass from Palm Wine”. American J. of F. Tech.2009;. 4: 60-65.
8. Ashraf, R. and Shah, N. P “Review Article Antibiotic resistance of probiotic organisms and safety of probiotic dairy products” Inter.Food.Res.J.201;.18 (3): 837-853.
9. Viktoria Hancock, Malin Dahl and Per Klemm “Probiotic *Escherichia coli* strain Nissle 1917 outcompetes intestinal pathogens during biofilm formation” J.of. Med. Microbiol.2009;.Vol, 59, 392–399.
10. P.c. Konturek, Z. Sliwowski*.et.al*“Probiotic bacteria *Escherichia coli* strain Nissle 1917 attenuates Acute gastric lesions induced by stress”.J. of physiol and pharmacol.2009;.6, 41-48.
11. Michael Schultz Grant Butt “*E. coli* Nissle 1917 in the Treatment of Inflammatory Bowel Disease”Practical gastroenterology.2010;.
12. Metchnikoff, E. Essaisoptimistes. Paris. “The prolongation of life. Optimistic studies”.1907;.
13. John J. Lal., C.V. Sreeranjitkumar and M. Indira “ A study on the chemical and biological composition of coconut palm wine”.2006.