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Isolation of Yeast from Various Fruit Sources

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Abstract: As for The yeast strains were isolated from various fruits such as 2 kinds of banana samples, water melon, dragon eye fruit, dragon fruit, pineapple, mango, pear, apple, cantaloupe melon, sugar apple, grape, papaya, pomegranate and persimmon. Totally fifteen fruit samples were collected from local market and eight yeast strains were obtained. The colonial morphology of all isolated strains shows creamy color on Peptone Yeast Extract (PYG) (Composition per liter: Peptone-20g, Yeast extract-10g, Glucose-20g, Agar-20g).Concerning fermentation pattern, almost all of the strains showed ferment glucose and also mannitol.

Keywords: yeast, fruits, isolation, fermentation

1. Introduction

Yeasts are used in many industrial processes, such as the production of beverages (baker's food and fodder yeasts) and various metabolic products. Due to the production of alcohol and carbon dioxide in the fermentation process, they are largely employed in baking, brewing, wine making and distilling industries. Brewers' and bakers' yeasts are the physiological variants of *Saccharomycescerevisiae* due to which its strains have been available in bulk quantities for almost a century [1].

Yeasts also have the ability to convert byproducts of low protein value into single cell protein which is then used for animal feeding. This has been recorded in the process of cheese making, potato processing, brewing and paper production. *Kluyveromycesmarxianus* produces enzymes that can be used to modify whey for the production of single cell protein [2].

Wide varieties of yeasts have been used extensively for the biological control of post-harvest diseases of fruits and vegetables, against moulds of stored grains and to control powdery mildews [06ElT]. Earlier reports explained the effect of yeast application on vegetative and fruit growth due to its richness in tryptophan which consider precursor of IAA (indole acetic acid) and on flower ignition due to its effect on carbohydrate accumulation [3].

Most of yeasts are used in biofertilizer as potential plant growth regulators. Yeasts synthesize antimicrobial and useful substrates for plants growth. Bioactive substances such as hormones and enzymes produced by yeasts promote active cell and root division. Their secretions are useful substrates for effective microorganism. But only a few attempts have been made to use yeasts as biological fertilizers.

Abd El-Hafez and Shehata (2001) used a *Rhodotorula* sp. as a biological fertilizer for tomato plants and reported gains in fruit weight, while the application of *Sporobolomycesroseus*in Brazil was reported to increase wheat yield by 16–30% [4].

Yeast, most commonly *Saccharomyces cerevisiae*, is used in baking as a leavening agent, where it converts the fermentable sugars present in dough into the gas carbon dioxide. Several yeasts, particularly *Saccharomyces cerevisiae*, have been widely used in genetics and cell biology. Because of those benefits, yeasts strains should be isolated.

The main aim of this study is to isolate yeast strains from the collected fruits and maintain the pure yeast strains in the department for various applications.

2. Materials and Methods

2.1 Raw Material

Totally fifteen fruit samples were collected from local market.

2.2.1 Media and chemicals

The chemicals and growth media used in this research work were obtained from the Department of Biotechnology at, Technological University (Kyaukse), Myanmar.

2.3 Isolation

The yeast strains were isolated from various fruits such as 2 kinds of banana samples, water melon, dragon eye fruit, dragon fruit, pineapple, mango, pear, apple, cantaloupe melon, sugar apple, grape, papaya, pomegranate and persimmon. 1g of each sample was crushed and mixed with 0.9% normal saline solution for about 30 minutes and then each loopful of samples was aseptically streaked out on PYG agar at pH 6-7 and incubated at 30+-2°C.

2.3 Cultivation of Pure Culture

After 48hrs incubation, a part of one colony on isolation medium was observed macroscopically and microscopically. Then the remaining part of the colony was sub cultured on PYG medium to obtain pure culture strain. Yeast strains were coded as C1, C2, W1, W2, DF, D1, B and G.

2.4 Morphology

The colonial morphology of the isolated strains was investigated on PYG media to check the color of the colonies, the margins of the colonies whether entire or lobed, the surface of the colonies whether smooth or rough, and elevation.

2.5 Fermentation of Carbohydrates

The ability of anaerobic assimilation (fermentation) of carbohydrates was determined by using peptone water broth with Bromothymol blue (2% solution) as indicator. 10 milliliter of the sterilized media was placed in the test tube and cooled at about 50° C. Then 2% of the tested sugar was added into the tube and one colony of the yeast strain was put into the tube and incubated for 30+-2° C. The result was observed daily up to 10 days incubation by according with the color changes.

3. Results and Discussion

Totally, 8 strains of yeast were isolated from the 15 fruit samples. The colonial and microscopic morphology of the isolated strains were shown in Fig 1,2,3,4,5,6,7and 8 respectively.All of the colonial morphologies on PYG media were common in creamy color. But the microscopic morphologies of all isolates were rather different.This is because of the different of the species.Most of the isolates having the activities were elongated and ellipsoidal shape in microscopic morphology and other oval yeasts among the fifty three isolates could not show the activities.To identify the yeast strains, carbohydrate fermentation is important and thus the carbohydrate fermentation tests were carried out. The fermentation pattern of the isolated strains was shown in Table 1.According to the fermentation pattern, almost all of the strains could ferment glucose and also mannitol. Most of the strains could not ferment the rest of the tested sugars.

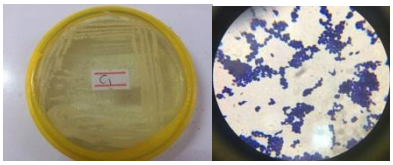

Fig. 1 Colonial and microscopic morphology of yeast strain isolated from cantaloupe

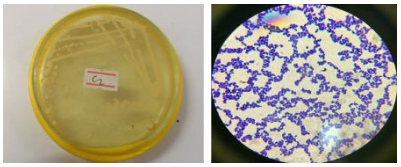

Fig. 2 Colonial and microscopic morphology of yeast strain isolated from cantaloupe

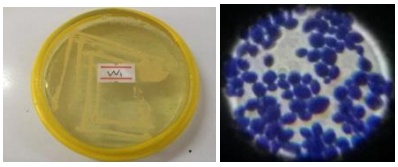

Fig. 3 Colonial and microscopic morphology of yeast strain isolated from water melon

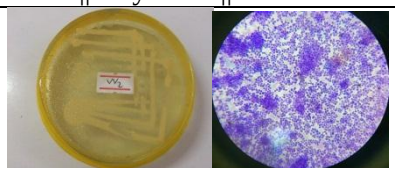

Fig. 4 Colonial and microscopic morphology of yeast strain isolated from water melon

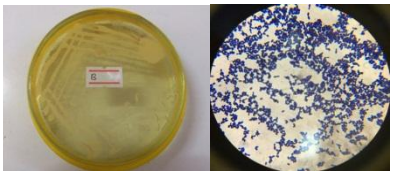

Fig. 5 Colonial and microscopic morphology of yeast strain isolated from banana

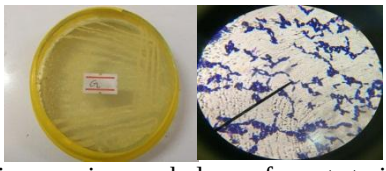

Fig. 6Colonial and microscopic morphology of yeast strain isolated from grape

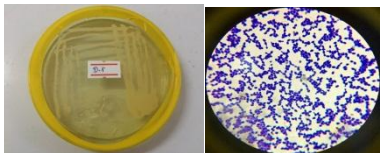

Fig. 7 Colonial and microscopic morphology of yeast strain isolated from dragon fruit

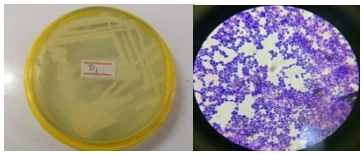

Fig. 8 Colonial and microscopic morphology of yeast strain isolated from dragon eye fruit

Table 1 Fermentation pattern for isolated yeast strains

Isolates	Glucose	Sucrose	Mannitol	Fructose	Xylose	Raffinose
C1	+	-	+	+	-	-
C2	+	-	+	-	-	-
W1	-	-	+	+	-	+
W2	+	-	-	-	-	-
DF	+	-	+	-	-	-
D1	+	-	+	-	-	-
B	+	-	+	-	-	-
G	-	-	-	-	-	-

(+)= Fermenting, (−)= Non-fermenting

Conclusion

Yeasts are notable organisms and they are used in traditional fermentations. Their involvement and importance in traditional food fermentations are unparalled by other organisms of biotechnological relevance. The abilities of yeasts are different if their species are not the same. Therefore, these isolated yeast strains should be identified to apply in the appropriate fields.

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