

CHARACTERIZATION OF THE TEA FUNGUS METABOLITES

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SUMMARY

The tea fungus (commonly designed as "kombucha") is a symbiotic culture of at least three microorganisms : the acetic acid bacteria *Acetobacter xylinum* and two yeasts *Zygosaccharomyces rouxii* and *Candida sp.* in sugared tea (Hesseltine, 1965; Anonymous, 1983). These microorganisms were cultured in their traditional medium and several metabolites were identified and quantified : ethanol, lactic, acetic, gluconic and glucuronic acids. The antibacterial product known as usnic acid was also searched.

INTRODUCTION

The symbiotic culture of *Acetobacter xylinum* and yeasts (namely *Zygosaccharomyces rouxii*, *Candida sp.* and other species) produces a zooglear mat. (Hesseltine, 1965; Kozaki *et al.*, 1972). The name "tea fungus" is a misnomer and arises from the bacteria's unique ability to synthesize a floating cellulose network that resembles a surface mold on non-agitated medium (Fontana *et al.*, 1991). This cellulose network is similar in composition to "mother of vinegar".

This symbiotic culture is grown traditionally on black tea with sucrose for 7 days and gives a pleasantly sour and sparkling beverage (teakwas) under aerobic conditions (Reiss, 1994). Longer incubations results in increasing production of acetic acid and in the formation of a mild vinegar.

The consumption of fermented tea was firstly practiced in 220 B.C. in Manchuria. It, then, spread to Russia where a wide literature on teakwas is available (Frank, 1990). During W.W.II, this beverage was introduced to Germany, then in the 50's, it arrived in France and also in France-dominated North Africa where its consumption was quite popular (Chambionnat, 1952; Zottner, 1952; Abadie, 1961). Presently, its consumption is popular in the United States, this popularity is mainly due to its refreshing power (because of its low ethanol content) and to speculative curative effects (including detoxifying properties from the high content of glucuronic acid, presence of vitamins B1, B2 and B6 and antibacterial properties due to the presence of usnic acid (Steiger and Steineger, 1957; Stadelman, 1961; Hauser, 1990).

A similar cellulose network floating at the surface of various fruit juices (namely coconut and pineapple) fermented by a symbiotic culture composed of *Acetobacter xylinum* and yeasts and named "nata" is consumed in the Philippines as a delicacy (Lapuz *et al.*, 1967; Dolendo and Maniquis, 1967). Lastly, in Brazil, this cellulose network is used for the treatment of skin burns and other dermal injuries and is