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Uses of *Oxalis corniculata* Linn as enhancer of breast milk by Kota tribe of Nilgiri hills, Tamil Nadu, India

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Abstract
Many ethnobotanical studies have revealed about the use of Innumerable floral species by ethnic communities as supplement to their diet. The present work deals with the practice of consumption of *Oxalis corniculata* Linn plant by the Kota tribal women to augment breast milk of new mothers. The plant is commonly known as creeping wood sorrel. Locally the plant is called 'Pulis'. This is the ever first reported finding from Nilgiri tribes specifically by the Kota tribe of Indian state of Tamil Nadu.

Keywords: breast milk, ethnobotany, *oxalis corniculata* linn, kota, tribe

Introduction
Treating different diseases by using plant parts are age old practice of human society. Nature offers us with a Pandora box, full of medicinal agents which can be used as primary healthcare to human in need. An impressive number of the world's inhabitants still rely on traditional medicines. Mentions about the use of thousands of herbs for medicinal purposes can be found in the Charaka Samhita, one of the earliest treatises of India. Many important lifesaving drugs used in modern medicine are being extracted from different herbs. Ethnic communities, living in undisturbed forest areas, still possessing their traditional food habit not only satisfy their hunger by consuming wild edible plants, but also proves nutritious too.

Present study explores the use of *Oxalis corniculata* Linn plant (Fig 1) as breast milk enhancer. Various studies done before on *Oxalis corniculata* Linn have shown the richness of the leaves from nutritional point of view. Nutritional composition (per 100 g dry sample) of leaves of *Oxalis corniculata* Linn shows high concentration of moisture (82.42± 0.5%), carbohydrates (24.67± 0.4%), crude lipids (23.75± 0.5%), crude proteins (22.28± 0.5%), nitrogen (3.56± 0.70%), calcium (2.5± 0.08%), potassium (2.17± 0.31%), Sodium (1.12± 0.02%) and Magnesium (0.25± 0.03%) [1]. According to review paper published in International Journal of Phytomedicine, [2], it has been noticed that *Oxalis corniculata* Linn is an endangered and medicinally important plant indigenous to tropical and subtropical regions. It reveals a wide range of phytochemical constituents of the plant like flavonoids, tannins, phytosterols, phenol, glycosides, galactoglycerolipid and volatile oil. It is a rich source of essential fatty acids which possesses important activities like Antioxidant, Anticancer, anthelmintic, Anti-flammatory, Analgesic, Steroidogenic, Antimicrobial, Antiamoebic, Antifungal, Astringent, Depurative, Diuretic, Emmenagogue, Febrifuge, Cardiorelaxan, stomachic and Styptic. The plant has got several medicinal uses. It is used for liver and digestive problems. It is used as antivenom in Zairean pharmacopoeia and treats poisonous snake bites [3]. The plant is well known as a good appetizer and removes anaemia, dyspepsia, dementia, convulsion and piles [4, 5]. It recovers jaundice, indigestion and diarrhoea in children if taken with buttermilk. It cures headache by the application of the leaves' paste [6]. It also reliefs from scorpion sting and are used to stop bleeding from wounds [7]. It is effective in skin eruptions and diseases like warts and corns. It is a useful remedy for insomnia. The plant is used in the treatment of scurvy. The phytoparisitic nematodes can also be treated by the ethanolic extract of *Oxalis corniculata* Linn plant [8, 9]. As *Oxalis corniculata* Linn extracts portray high antioxidant activities and possess numerous precursors of antimicrobial compounds, it supports folkloric use as a cure for some human ailments [10].

Another study reports on the use of *Oxalis corniculata* Linn as alternative vegetable by some tribes of central India [1]. The Sahariya tribe of Madhya Pradesh consume the plant either as

raw in salad form or cook it for making sandwiches, pickles etc [11].

The boro tribals of Assam use the herb juice as eye drop in conjunctivitis [12]. The Tamang tribal people of Kabhrepalanchok district of Nepal use paste of *Oxalis corniculata* Linn plant and mixes with butter for the treatment of muscular swelling caused by bruises [13]. In Nepal the plant is also used for stomach ache. *Oxalis corniculata* Linn or Jujur saang (as known in Nepali) is used as medicinal herb [14]. People of Cameroon use the plant for the treatment of gonorrhoea [15]. Dwellers from Chakwal Tehsil of Pakistan use the plant sap for treating skin diseases. It is also used to cure sensitivity of teeth [16]. A study done on ethnomedicinal usage of different medicinal plants by the Apatani tribe of Arunachal Pradesh has shown the use of shoot of *Oxalis corniculata* Linn as an appetizer and in curing headache [17].

Fig 1: Leaves of *Oxalis corniculata* Linn.

Materials and Methods

A field visit was conducted from 19. 07.2018 to 21.07.2018 on the Particularly Vulnerable Tribal Groups (PVTGs) of Nilgiri district of Tamil Nadu state of India. To study the traditional healthcare practices, we have interviewed Kota tribal women in a one-to-one manner and also held focus group discussions on uses of locally available medicinal plants.

Kota a particularly vulnerable tribal group (PVTG) of Tamil Nadu

The Kota tribe is one of six PVTGs residing in the Nilgiri hills of Tamil Nadu in South India. The Kotas are considered to be the most ancient inhabitants of Nilgiri district. They belong to the Indo-Dravidian Negroid racial group. Kotas were mainly blacksmiths, making an array of implements including big cooking vessels. Next only to ironsmithy is their expertise on leather works. They collect the hides, cure them and make a number of goods including parts of musical instruments. Kotas are also experts in carpentry and basket making. According to Caldwell (1856) [18], there language is Dravidian, and he considers it as a branch of Kannada. The Kotas live in seven settlements in Nilgiri district. These villages are called as 'Kokkal' in their dialect, and the outsiders call them as Kotagiri, meaning Kota hill. The settlements are at Trichigadi, Sholur, Koliimalai, Kundah Kotagiri, Aggal Kotagiri, Kil Kotagiri and Gudalur. Kundah Kotagiri is 40 km away from Udhagamandalam towards southwest. According to Kota puranas, Kundah is the first Kota settlement.

Use of *Oxalis corniculata* Linn as enhancer of foetus size and breast milk

The Kota tribal women of Kundah Kotagiri village eat the leaves of *Oxalis corniculata* Linn which is known as ‘pulis’ in their language and locally known as ‘pulchingay’, during pregnancy for maintaining the good health of the foetus. They believe that it enhances the growth of the foetus, gives warmth and increase the immunity power. A thick paste of the leaves is made with ‘rasam’ (soup made from tomato, tamarind, curry leaves), and ginger and is given to pregnant woman on her 4th and 6th month of pregnancy. It also helps to augment breast milk of the lactating mother. They start the dosage from the fourth day post-delivery and continue it up to months after delivery. They even apply the paste of the ‘pulis’ leaves on the belly of the new mother to diminish the pain after delivery. The plant is a bit delicate in appearance, herbaceous low-growing in damp shady places. Leaves are palmately compound, trifoliate. Petioles are green in colour and somewhat sour in taste. It belongs to the Oxalidaceae family of plant kingdom. It has got many synonyms in different languages. In Sanskrit it is known as ‘Ambashta’, in Hindi it is known as ‘Anboti’, in Bengali it is known as ‘Amrul’, in Kannada it is known as Teltuppi, in Malayalam it is known as ‘Puliyaral’, in Marathi it is known as ‘Ambuti’, in Tamil it is known as ‘Puliyarail’ or ‘Pallachinta’ [2]. The plant is a good source of vitamin C and Carotene. The leaves of Oxalis can be used as an alternative to vegetables as it contains moisture, carbohydrate, crude protein, crude lipid along with essential minerals like Sodium, Potassium, Calcium, Nitrogen and Magnesium. Numerous papers and reports have been published with ethnomedicinal claims of *Oxalis Corniculata* Linn has been. But the knowledge of using Oxalis leaves for breast milk augmentation is being reported first by the Kota tribal women.

In conclusion, further study on the hormonal profile of *Oxalis corniculata* Linn may be required to understand the assertive impact on breast milk augmentation.

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