ES 21: Innovations in Traditional Utilities of Marigold

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Marigold is a popular flower crop grown throughout the world on commercial scale. Marigold stands first among the loose flowers in Goa and its requirement increases many folds on special occasions like Ganesh Chathurthi, Dussera, Diwali, weddings, etc. Its scientific cultivation fetches good economic returns, improving the livelihood of small and marginal farmers. The commonly cultivated species of marigold are African marigold (*Tagetes erecta*) and French marigold (*T. patula*). The former generally grows tall and is known as tall marigold and latter is short called as dwarf marigold. There are several other important species viz., *T. tenuifolia* L (striped marigold), *T. lucida* L. (sweet scented marigold), *T. minuta* L (perfume marigold), Signet marigold (*T. signata*), etc. The name *Tagetes* was given after 'Tages', a demigod known for his beauty. Marigold has been named after Virgin Mary. King Curtez, after conquering Mexico, got fascinated by the beauty of the flower and carried it to Spain. It was then offered to the altar of Virgin Mary and thus, was named as Mary's gold, now, popularly known as marigold. Flowers of marigold are extensively used in the preparation of garlands, as loose flower on the occasion of religious ceremonies and festive occasions, and as offerings and decorations at funerals, weddings, and other ceremonies.

Apart from the ornamental value of loose flowers, carotenoids extracted from flowers are used for industrial purpose. It is used commercially in pharmaceuticals, food supplements, animal feed additives and as colorants in food and cosmetics. Lutein, which is an oxycarotenoid, or xanthophyll, is one of the major constituents and the main pigment of *T. erecta*. It serves as source of pigment for poultry feed. The pigment is added to intensify the yellow color of egg yolks, broiler skin, ornamental fishes, etc. Marigold flower contains abundant amounts of lutein. Lutein, contained within the flower's petals, is extracted, purified, and formulated into a natural, crystalline lutein extract. It is then added to an array of foods and dietary supplements from multivitamins to fruit and vegetable juices. Our body does not manufacture lutein but it gets lutein by eating foods containing lutein. Lutein is a powerful antioxidant, which studies show, can contribute to the protection of cells in our body. Lutein plays an important role in protecting eyes and increases eyesight. Use of lutein supplements might help prevent the development of cataracts. Lutein supplementation may be beneficial for the management of age-related macular degeneration. Lutein

food color for food products that include dairy products like butter, ghee, cheese, ice cream, and margarine as well as some oil and bakery products.

Marigold has a strongly aromatic essential oil (*Tagetes* oil). After plucking the flowers the marigold plant can be processed for oil extraction. The remaining processed material can be utilized for mushroom production and as organic manure and mulching material to the other crops for eco-friendly cultivation. The aromatic oil extracted from *T. minuta*, which is being traded as "Tagetes oil", is a fly repellent and has also got larvicidal properties.

Marigold has different phytochemical constituents like quercetagetin, a glucoside of quercetagetin, phenolics, syringic acid, methyl-3,5-dihydroxy-4-methoxy benzoate, quercetin, thienyl and ethyl gallate, terpines, etc. in different parts of the plant. Leaves are reported to be effective against piles, kidney troubles, muscular pain, ulcers, and wounds. Pounded leaves are used as an external application to boils and carbuncles. Flowers are useful in fever, epileptic fits, astringent, carminative, stomachic, scabies, and liver complaints and are also employed in eye diseases. They are said to purify blood and flower juice is given as a remedy for bleeding piles and also used in rheumatism, colds, and bronchitis. Marigold flowers can be used for dyeing textiles and residuals can be used as bio-fertilizers. These flower dyes are eco-friendly and have no side effects on skin. Different shades of color can be obtained using different mordant and the color fastness and wash fastness properties also can be improved by different treatments procedures and can be used both in small scale industry as well as in large scale industry. Flowers can also be used in preparation of cosmetic accessories, pharmaceuticals, crayons, textiles, floor wax, shoe polishes, etc.

As an ointment, marigold is an excellent cosmetic remedy for repairing minor damage to the skin such as sub dermal broken capillaries or sunburn. Marigold can be also grown as a trap crop in agriculture against some of lepidopteran and coleopteran pests and nematodes. Marigold has been proved to have different pharmacological activities like antibacterial activity, anti-microbial activity, hepatoprotective activity, insecticidal activity, mosquitocidal activity, nematicidal activity, wound healing activity, anti oxidant and analgesic activity, larvicidal activity, etc.

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