In-vivo **Anti-inflammatory activity of Gold Nanoparticles synthesized from isolated flavonoid of *Sonneratia alba* fruits**

P. G. GAWALI[1], B. L. JADHAV[1], S. S. BHIDE[2]. [1]DEPARTMENT OF LIFE SCIENCES, UNIVERSITY OF MUMBAI, MUMBAI, INDIA, [2]DEPARTMENT OF PHARMACOLOGY AND THERAPEUTICS, SETH GS MEDICAL COLLEGE AND KEM HOSPITAL, MUMBAI, INDIA.

BASIC SCIENCE, TRANSLATIONAL AND CLINICAL RESEARCH ABSTRACTS

Introduction: Mangrove plants are rich source of flavonoids, alkaloids, saponins etc with wide range of medicinal properties. Among these Flavonoids are known to have anti-inflammatory activity[1]. Nanoparticle (Nps) made of Natural products are known to improve their medicinal potency***.*** In the present study we have synthesized a simple, eco-friendly and stable Gold Nanoparticles (GNps)[2] of flavonoid isolated from *Sonneratia alba* fruit and studied *in-vivo* anti-inflammatory activity using Carrageenan-induced mouse paw edema[3].

Method: *S.alba* fruits were collected from Ratnagiri coast, Maharashtra, India, methanol extract was prepared and flavonoid was isolated by chromatography. The characterization of isolated flavonoid was done by LCMS, FTIR and NMR. Synthesis of simple, ecofriendly and stable gold Nps of isolated flavonoid (FS) and standard quercetin hydrate (QF) was done and characterized by SEM, TEM, EDS and XRD [2]. *In-vivo* acute toxicity and anti-inflammatory activity of FS and QF GNps was carried out by CPCSEA and OECD guidelines. To do this, inflammation was induced by carrageenan in 6 groups of mice (n=6) and the anti-inflammatory activity is evaluated with Digital plethysmometer using Diclofenac Sodium (Standard Drug), low (200mg/kg BW) and high (800mg/kg BW) dosages of both the GNps. Data was statistically analyzed by ANOVA.

Results: The isolated compound was characterized as Quercetin. Stable GNps from FS and QF were synthesized within 2- 5 min with complete bioreduction at RT. Both the synthesized GNps were spherical, anisotropic and found its crystallite size. Significant ($p<0.001$) reduction in paw volume was observed in low and high doses of QF and FS GNps treated mice over disease control group (Table 1). All were compared to diclofenac sodium group at 2 to 24hrs. All treated groups except mice administered FS low dose, the paw volume reduced from 3 hrs ($p<0.001$) which was comparable to Diclofenac sodium (till 5 hrs) than disease control group. In all groups Paw volume returned to normal at 24 hrs.

Conclusion: This is the first report on the synthesis of simple, ecofriendly, stable, nontoxic and anti-inflammatory GNps of isolated quercetin of *S.alba* fruits. The anti-inflammatory efficacy of isolated quercetin GNps was comparable with standard Quercetin hydrate as well as Standard Diclofenac sodium drug.

References:

1.JV Formica and W Regelson (1995). *Fd Chem. Toxic* 33: 1061-1080.

2.Ghosh S *et al.* (2012). *Int J Nanomedicine* 7: 483-496.

3.Cirino G *et al.* (2004). *Br J Pharmacology* 142: 331-338.

Table 1: Effect of Both GNps and Diclofenac Sodium on Paw Volume of Mice

Paw volume (ml) of mice measured in hr	Carrageenan group Diseased Control	Diclofenac Sodium group Positive Control	FS GNps low dose group	FS GNps high dose group	QF GNps low dose group	QF GNps high dose group
Before Drug	0.01±0.00	0.01±0.01	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00
2 hr	0.05±0.01#	0.06±0.01*#	0.05±0.01*#	0.06±0.01*#	0.06±0.01*#	0.06±0.01*#
3 hr	0.05±0.01#	0.04±0.01*#	0.03±0.01*#	0.01±0.00*	0.02±0.00*@	0.01±0.00*
4 hr	0.05±0.01#	0.02±0.01*	0.01±0.00*	0.01±0.00*	0.01±0.00*	0.01±0.00*
5 hr	0.06±0.01#	0.01±0.00*	0.01±0.00*	0.01±0.00*	0.01±0.00*	0.01±0.00*
24 hrs	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00

Time dependent (0-24hr) effect in paw volume in (ml)
Values represent Means±SD
***Disease control vs Diclofenac, FS low dose, FS high dose, QF low dose, QF high dose ($p<0.001$)**
@ FS high dose vs QF low dose ($p< 0.05$)
 # Before vs 2, 3, 4, 5 hrs ($p< 0.01$)